

TO MY WIFE

# PRACTICAL COST ACCOUNTS

*Applicable to various Industries  
with 33 Forms and Graphs*

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with FOREWORD by  
VISCOUNT WEIR

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## FOREWORD

The attainment of success in practically every sphere of industrial enterprise has become increasingly difficult and hazardous, but it is still within the reach of those who have prepared and equipped themselves for the effort. This preparation involves the discarding of ideas, methods, and opinions which may have been of value in the past, but which no longer meet the requirements of present economic conditions. The equipment necessary for such success lies in the efficient administration and management of all industrial activity.

The administrative heads who determine the policy of a business make decisions of such magnitude that even one error of judgment may prove disastrous, while the management, in carrying out these decisions, are responsible to direct all productive effort to a successful issue.

This can be achieved more readily and with better results when the management know the vital facts of the business, and have the financial results of their efforts constantly under periodical review. They should know not only that the business is prospering or otherwise, but also what are the sources of profit, and where and why losses have arisen. Such information can only be furnished by a modern system of cost accounts controlled by an accountant who can analyse and classify facts and figures in a clear, practical and concise manner. The results shown may seriously affect present or future policy, but will certainly contribute to the welfare of the business.

In these days of keen competitive effort when profits are scarce and cut to the finest margin, accurate and detailed costing has become essential, and the position of cost accountant is now one of primary importance in every industry.

Mr. Miller's experience in this field is unusually large and eminently practical, as his earlier work on the subject has disclosed, and from my personal knowledge of his collaboration with my old friend, the late Sir Wm. Rowan-Thomson, I feel sure this guarantees to the reader of this new work, an applicational value of real importance.

WEIR





## PREFACE TO THE LATER EDITIONS

An opportunity has been taken in publishing these new editions of including two new chapters regarding Standard Costs and Budgetary Control. The text of some of the earlier chapters is also useful for the suitable application of these methods, and reference has been made accordingly.

Proof has been obtained that the subject matter generally and the forms and graphs have been of practical use to manufacturers, and also valuable for tutorial work. To increase this usefulness, specimen questions are shown where possible at the end of the relative chapters, for the use of students and others interested.

Some of these questions are from recent accountants' examinations of which acknowledgment is gladly given. The others have been framed to emphasise the practical usefulness of the book, which was appreciated by the accountancy and technical press in the reviews of the earlier editions.

*Jordanhill, Glasgow, W 3*

ment All the necessary factors being ultimately organised to work simultaneously and efficiently they give accurate and prompt total costs of manufactures

Although complete guidance may be given for the installation of cost accounts, the successful application of these does require the services of a thoroughly qualified and efficient cost accountant, or the work of one who can acquire this ability and experience The particulars which follow have been successfully used in practice, and specimen forms are bound separately at the end of the book to increase the usefulness of the information given The chapter entitled "Labour Payment by Results" is part of an article which appeared in *The Accountant* and permission has been kindly given for inclusion here

*Jordanhill, Glasgow, W 3*

## CHAPTER I

### COST ACCOUNTING

Interest in cost accounts has been considerably increased in recent years, but it is not likely that any cost accountant, no matter how efficient and enthusiastic, can now show a successful method of cost accounting that is entirely novel to those engaged in such work for manufacturing trades. A statement of this nature now may prevent disappointment, as the remarks that follow will probably cover ground familiar to many cost accountants. If confirmation is obtained in this way of successful application, then an understanding has been reached which will be useful.

On the other hand the particulars now presented may enable others to observe the practical results of cost accounts for manufacturers. Notwithstanding the increased attention given to the subject in these days, even yet some manufacturers may not have given cost accounts much consideration, perhaps because the welfare of their business has not compelled them to do so. From the earliest days when primitive men bartered or had transactions in articles or materials with each other, some idea of cost, selling value, and purchasing price exercised the minds of the participants to these transactions.

If we could analyse the minds of primitive men in these early ages, or of the most primitive races living to-day, we might learn something of the way in which they would determine the sales value or purchase price of articles in which they were interested. Brief consideration of this aspect of cost may not be without value, because it would likely be of a very practical nature. If such a man had possessions or products to sell or exchange, he would likely desire payment in foodstuffs for his sustenance or furnishings for himself or his dwelling. A practical estimate of the food required in exchange for his articles would be a sufficient quantity to satisfy him until he could obtain more articles for barter, if he was satisfied with a bare existence.

The working of the primitive mind with a manufacturer as dealer is more difficult to comprehend. The exchange then

might be for articles of brass or other materials probably priceless to the primitive mind and therefore valued much in excess of their actual production cost. If we dwell unduly on such abnormal increases of value, we may disturb the peace of mind of those engaged in such trades. It is useful to take these long views, especially when we are informed that so much is new and has not been known before. Sometimes, after careful investigation, we obtain further proof that ideas and principles regarded as novel have been known in earlier ages.

#### REPETITION OF PRINCIPLES

We can prove such experiences, if we take one or two examples from scientific and more mundane affairs. In this respect it is interesting to note from Dr. Perry's well-known work on the Steam Engine, that Hero of Alexandria (120 B.C.) used steam to turn a reaction wheel and thus described the steam turbine. In an edition of his book published over thirty years ago, Dr. Perry remarks "The student of history fails to notice that traffic has always increased on common roads, and that although railway traffic may steadily increase it may become less important again than the road traffic." Recent transit developments in this country have helped the possible fulfilment of this prophecy, the changes being due to decreased cost in time or money and sometimes in both. We can also observe sometimes the return to first principles in some aspects of commerce, which are more nearly related to accountancy than either of the foregoing examples.

The art and practice of book-keeping in one form or another must be as old as civilised trading, but the present form of double entry for ordinary commercial accounting can be traced back only to about the end of the 15th century, when it was in use among the merchants of Venice and other commercial cities of Italy. It has been said that these earliest Italian merchants used vertical receptacles for retaining documents incidental to their book-keeping, such as we sometimes observe in the shops of apothecaries or Italian warehousemen. The advent in recent years of those very useful vertical filing appliances of wood or metal, which were probably originally made in America for commercial purposes, apparently reproduces the first principles of the Italians for filing purposes.

## FINANCIAL ACCOUNTS

If we continued our historical survey of other spheres of the world's activities, we would likely discover other instances where history repeats itself. It is well to have an open mind when new methods or principles are brought to our notice, even for cost accounts, which to some constitute a comparatively new branch of commercial work in manufacturing trades. If we assume the absence of cost accounts, the only insight that can be obtained of manufacturing results financially is from the usual trading account, profit and loss account and balance sheet. So far as actual costs are concerned, the most useful information in these circumstances would be obtained from the trading account, and in a lesser degree from the profit and loss account, as shown by Forms 1 and 2. The possible use of the usual manufacturing or trading account for cost purposes can be observed, if we consider briefly what constitutes the account. We may assume, for illustration, a factory or a department entirely engaged in producing one size of wood boxes or packing cases. Allowing for debit of stock on hand at the beginning of the trading period, i.e. materials and manufactures, and also for work in progress, and similar credits at the end of the period, we can simplify the account for cost consideration. The debits to this account will therefore include materials, perhaps raw and unfinished, wages paid, furnishings and consumable supplies, etc. Debits for rent, taxes, insurance, power, heat and light, depreciation and repairs of property and plant, all as applicable to the departments covered by the accounts, can also be included. The credit to the account will be the value of the sales for same period, and the difference in the two sides of the account will be the profit or loss in the actual manufacturing.

If the sales credited represent a uniform product, the output can be accounted in a standard unit by weight, numerical quantity, or other measurements. The production cost per unit is obtained by dividing the total of the debits to the account by the units produced in that period. If the production, in the example we have assumed, consists of large boxes the cost would be obtained per box, or for smaller boxes per dozen or per gross. If only one class of materials or supplies is used for manufacturing the cost per unit produced, for material only, can be obtained in like manner. Wages in trading account may be

shown divided into productive or direct wages and non-productive or indirect wages, so that these costs per unit can be obtained, and so on for the different items of cost and oncost that appear in the trading and profit and loss accounts. As will be observed later, financial accounts can give approximate results of departmental or process costs only, and are of very little use for costs of jobs and orders of a varied nature.

## CHAPTER I

### EXAMINATION QUESTIONS

- 1 *Prepare a trading account supplying your own figures and account headings. Show the cost for each item allied to production, including departmental oncost, departmental profit and sales price, all on the same unit basis.*
- 2 *Draft a skeleton form of monthly profit and loss statement, showing departmental trading profit, general oncost items and nett profit, and the cost of each on the same production unit basis.*
- 3 *What advantage is derived from the preparation of monthly trading account, profit and loss account and balance sheet?*
- 4 *Incorporate in a trading and profit and loss account final cost particulars for a product with which you are familiar, and give as much detail as possible.*
- 5 *To what extent should overhead expenses be included in the finished stocks? What would the effect be if these were excluded from the valuation? How would the comparison of actual accounts be affected?*

*Final, I C W A, 1941*

- 6 *By altering the conventional form of Trading and Profit and Loss Accounts of a manufacturing business, useful costing statistics may be shown. Draw up an account in such revised form.*  
*Inter, I S A A, 1944*

- 7 *The management wish to know the estimated weekly profit of their factory output, based on current sales values. Prepare a statement to show this and indicate how the figures would be obtained.*

*Final, I C W A, 1945*



## CHAPTER II

### CAMPAIGNING AGAINST WASTE

Accounting of costs has always been essential to some degree in all businesses, although the extent of the accounting and the method adopted depends largely on the nature of the business and the requirements to be satisfied. Professional men, including accountants, calculate their fees, whether standard or not, according to the time likely to be occupied in doing a particular job and to cover the cost of their services for the period, plus the profit desired. Steamship owners account their expenses per voyage, to determine the freight rate necessary for profitable working. Railway and transport companies cost the carrying per ton mile, electricity generating stations cost per unit produced, and manufacturers generally cost on the basis of the jobs done or output obtained.

#### OBJECTIONS TO COST METHODS

Cost methods differing in detail may be applied in the same class of business, with equally satisfactory results, but the deciding factor in such cases, to determine the best method, will likely be the expense of the cost finding. This objection of expense is that most frequently offered to the extension or installation of cost accounts, but the consideration of it brings into prominence that one of the chief functions of cost accounts is to eliminate waste. Cost accounts when thoroughly efficient must eliminate all waste in their own operation, as well as all waste incurred in production or business services. If the expense incurred in operating cost accounts does not prove to be a small fraction of the saving effected from the information obtained, the cost accounting has certainly not proved its possible efficiency. An objection, sometimes used against cost accounts for certain businesses, is that the business being of a special nature it is not practicable to obtain reliable cost data. In all branches of commerce, some cost information can be accounted which will more than repay the expense incurred for the accounting.

#### CONTINUOUS COST

There are certain businesses where it may not be advisable to operate continuously completely detailed cost accounts, be-

cause of the continuity and similarity of production and the usually small variation in cost, the expense of regularly recording all cost details is not warranted. This is one of the achievements of a complete and efficient cost system, when the information, thus provided regularly, permits a discontinuance of accounting certain cost details continuously. From the data obtained these details can always be accounted on a percentage basis, and can be checked by actual complete accounting when desired.

If we assume the absence of cost accounts in a special or unique business, as already observed, the only insight that can be obtained of manufacturing results financially is from the usual trading account, and from the profit and loss account. These financial accounts are necessary to satisfy other requirements, even in a monopoly business where costs may not be so essential. All businesses therefore accumulate cost data regularly, although it may be of a very primitive nature.

#### COST FAILURES

Another objection used against the adoption of cost accounts is that these have been known to fail. Either they were impracticable because the wrong method had been adopted, or the correct method had not been properly operated, through lack of the necessary detailed information, or they failed because of lack of co-operation by the management, or on account of opposition from other employees. All these aspects of failures can be observed in other phases of commercial and industrial activity. If a machine tool operated successfully elsewhere breaks down through a defect or careless working, it is not proved to be a useless tool, but can be repaired and adjusted and operated successfully again with the necessary ability. This also applies to cost accounts which like steam engines have been of many forms. The direct acting form of steam engine has survived the others of early days, and so direct acting cost accounts can be applied successfully in some degree in all businesses.

#### ADVANTAGES OF COST METHODS

Having considered briefly the objections to cost accounts, which may be summarised as (1) expense of accounting, (2) special or unique nature of business, and (3) failures of cost methods, a similar brief survey can be given to the advantages

of accurate costs. It has already been indicated that the elimination of waste is one of the chief objects of costs accounts, and this is a permanent possibility of efficient cost accounting, along with the other advantages that can be obtained.

Equally important with the approval of design of new buildings, bridges, ships, engines, motor vehicles, or any factory products, is the agreement of the price to be paid for the contract. The orders for such work are usually obtained on the competitive basis, and sometimes a specification may indicate an approximate price or price limit which will be paid for the product required. In either case, whether design and price are without restriction or the one has to be relative to the other, the preparation of the estimated cost is very important and responsible work. In the absence of any accurate cost records of similar work, very much more care and trouble is necessary to estimate the cost. As outstanding advantage of accurate costs is their great usefulness in preparing accurate estimates for new work under various market conditions, thus saving expense in estimating, and avoiding waste and many possible unknown losses in manufacturing.

#### ESTIMATES AND COSTS

Reliable cost accounts, apart from giving a basis for accurate estimates, can provide for comparison to be made between previous estimates and ultimate costs of each article and operation or job. This can be done for material used and comparative methods of manufacturing as well as for labour comparisons under different systems of wage payment. These costs can also be compared with other makers' selling prices, and thus eliminate unnecessary manufacture, if subsidiary parts or supplies can be purchased cheaper elsewhere. Accurate costs enable standards to be adopted for purchase prices of raw materials, operative and labour payment, as well as production capacity for machines and departments, to ensure efficient manufacturing.

Standard price lists for products can be based on efficient costs, and selling agencies thereby informed of the marginal discount permissible to combat very keen competition, and they can also be advised in this way of the most profitable products. This is very essential information, because producers sometimes accept orders at less favourable prices, with a view to obtaining other orders from the same customers later, which will give

a bigger margin for profits. Indirect cost or oncost is a very important part of cost accounts, and the correct accounting and allocation of oncost is imperative for obtaining accurate costs. Without accurate costs manufacturers, who have been kept busy on unprofitable products, are sometimes surprised at the yearly financial results showing little or no profit.

#### COSTS AND FINANCE ACCOUNTS

Apart from the usefulness of costs in the elimination of waste, the preparation of estimates, standards of output and selling prices, they are of considerable use in the financial control of manufacturing businesses. Stock material accounting, which is an essential phase of cost accounts, enables careful observation to be made continuously of the financial obligation incurred for these requirements. This also prevents unnecessary burden of waste for excessive stock, and provides opportunity for the disposal of obsolete material not required and which can be sold. Complete cost accounts of finished manufactures and work in progress, along with the necessary stock accounts, enable interim trading accounts, profit and loss accounts and balance sheet to be prepared regularly during the financial year. These financial accounts can be obtained without all the extra work of physical stock-taking of stocks and work in progress. It is also possible to interlock cost and financial accounts regularly, without much extra trouble, so that cost records can account for all the expenditure for manufacturing as shown by the financial accounts during a particular period.

Advantages of accurate costs can therefore be summarised thus: (1) Elimination of waste in purchasing, producing manufacturing and selling, and this has a permanent possibility with the other advantages, which are (2) accurate estimates, (3) standards of costs, selling prices and production capacity, and also standards for comparison of various methods, (4) continuous control of expenditure, and (5) opportunity for interim financial accounts and interlocking of costs with these.

## CHAPTER II

### EXAMINATION QUESTIONS

- 1 *State five advantages of accurate cost accounts for helping production management*
- 2 *Show that cost accounting is essential to industrial efficiency and briefly state some of the advantages*
- 3 *Detail some of the probable causes of factory leakage and waste*
- 4 *Discuss the value of costing in the prevention of waste, and show how its influence in this direction can be utilised to the utmost advantage*

*Final, I C II A, 1936*

- 5 *State briefly what you understand costing to be. What are its main functions as regards*
  - (a) *Manufacturing businesses,*
  - (b) *A departmental store?*

*Final, I C C A, 1940*

- 6 *A good costing system can be formulated for the purpose of —*

- (a) *Ascertaining costs of production*
- (b) *Controlling and limiting expenses*

*Explain the nature of the additional information required for the latter, and if (a) and (b) above can be made complementary each to the other*

*Inter, I C III A, 1943*

- 7 *You are asked to determine the "break-even" point in a business (that is, the point of turnover at which the business is making neither profit or loss). Outline how you would approach the task, and the figures and information that you would require*

*Final, I C W A, 1943*

8 *Describe the organisation of a salvage department, the object of which is to minimise loss of defective work and obsolete or surplus materials. Illustrate the records and periodical statements which would be prepared.*

*Inter, I C W A, 1944*

9 *Discuss the arrangements which would be necessary to cost the wastage of material in a factory producing clothing partly on Government contract and partly for private trading. Cloth for Government work is a free issue based on a standard quantity specification per article, but any further wastage is on a company's account.*

*Final, I C W A, 1944*

10 *Cost of products may be prepared for the fixing of selling prices and, in consequence, not be in a form suitable for the control of expenses. Describe the additional particulars required for the latter purpose.*

*Final, I C W A, 1944*

### CHAPTER III

#### ELEMENTS OF COSTS

With the advent of many mechanical aids for accounting large numbers of cost transactions, there is unfortunately a tendency to minimise the importance of clear and speedy penmanship and figuring in operating cost records subsidiary and important. There is much of this work which has to be and will always require to be done, methodically and neatly, by handwriting. A well-known professor of mathematics has said that, in answering the problems of his subject, it is important to give the solutions in a methodical and proper manner, so that these can be readily understood and checked. Although there may be an error in the figuring, methodical answers are almost as useful as correct answers achieved apparently out of chaos.

It is well to remember, on considering the principles and practice of cost accounting, that there will always be opportunity in such work for capable penmanship and methodical application. Those who have to consider applications for positions of this kind, have frequently reason to doubt whether this fact is sufficiently well recognised. As we consider the elements of cost and think of the transactions they involve, and the work of reporting these for cost purposes, the importance of clear and quick recording for accounting is very apparent.

The elements of manufacturing cost, which also cover the expenditure for selling, may be enumerated as material, labour, and expenses, and each of these elements can be incurred directly and indirectly. There will therefore be direct material, direct labour and direct expenses, as well as indirect material, indirect labour and indirect expenses. The direct cost of material, labour and expenses, is for that which is ultimately actually part of the manufactures, or can be applied as cost exactly as incurred directly for the manufactures. This, and the following definition of indirect cost, is given as a broad basis applicable to all classes of manufacturing. Indirect costs of material, labour and expenses, are generally items of expenditure created in the course of manufacturing and in working an establishment, but which have no apparent value. The direct cost is the prime cost being based entirely on the manufacture supplied. The

indirect cost elements are generally known collectively as oncost, as their allocation is usually based in some manner on prime cost or on production. Prime cost plus oncost gives the total or gross production cost.

#### DIRECT ELEMENTS

Direct material includes all raw and finished goods supplied by others or from the manufacturer's own stock, for the complete product produced. In the case of material from outside suppliers this cost will include labour, which may have been utilised by the supplier or sub-contractor in preparing the materials or product supplied. The source of charge will be the supplier's invoice for outside supplies, and the stock department or manufacturing department's debits in a manufacturer's own business, if subsidiary stock material items are made or stocked there for an ultimate major product.

Direct labour is the production labour cost incurred entirely on the product, and which can be accurately accounted to it. This is readily accomplished, with a labour cost book, Form 10, as the ultimate source of charge, and it is usual to segregate this cost by classes of labour or trades as well as by operations, or to different sections of the product if required. Direct labour may also be considered as all visible and tangible labour, expended directly on the work produced.

Direct expenses largely consist of special expenses, incurred entirely for the particular product or cost account, such as transit charges if important, royalties, survey fees and special tests, travelling expenses, outside crane charges, dock dues, etc. It will be evident then, from the foregoing illustrations, that all items of prime cost can be classified as one of these three elements.

#### INDIRECT ELEMENTS

Indirect cost or oncost is frequently divided into departmental oncost, general oncost and sales oncost. Other terms used with the same division into departmental, general and sales, are "burden," "overhead," "charges" or "operating expenses." Obviously the departmental oncost when accounted separately, is allocated to certain departments because it is entirely incurred by them. General oncost is usually incurred in operating the entire manufacturing establishment, and this is sometimes called general services, and is frequently allocated to all depart-



ments or to those affected. It is certainly allocated to more than one department, otherwise it would be accounted as departmental oncost. Sales oncost is a small percentage of total cost sometimes, and only consists, in certain manufacturing establishments, of an estimating department and publicity section, so that it can be conveniently added as an item of general oncost. Where the sales oncost is considerable, owing to extensive advertising and the necessity for a large selling staff, as in the case of domestic supplies, the sales oncost can be accounted territorially and allocated by production classification, or on the basis of selling value.

The indirect material element in oncost covers material which cannot be accounted directly to the product, and largely consists of consumable supplies such as furnishings, waste, oils, small tools, etc.

Indirect labour represents the wages of storemen, gatemen, factory clerks, foremen, also salaries and commissions of salesmen, managers, and other officials, and this may be accounted departmentally, generally, or as sales oncost when incurred for selling, in accordance with the particular method adopted.

The indirect expense element in oncost may be generally incurred in maintaining property and assets at their proper efficiency, for manufacturing and sales purposes. Specimen items are—rent, insurance, rates, depreciation, property and plant repairs and renewals, power, light and heat, warehousing and sometimes packing, shipping and delivery charges. There are also general travelling expenses and the usual charges for stationery, telephone and postal services.

There may be a further segregation necessary of administrative expenses where a staff, managers and directors, are engaged generally in controlling and supervising the manufacturing and sales departments. This may include, besides the usual salaries, other charges, such as the audit fee and possible legal expenses. The apportionment of the total administrative expenses to factory production cost and to sales oncost is sometimes a difficult matter. If the expenditure has been incurred for both it has to be allocated in accordance with the best information available.

#### MINIMUM ELEMENTS

Having briefly considered the elements of cost as material, labour and expenses, direct and indirect, it can now be said

that for practical purposes these may be reduced to material and labour without loss of efficiency in accounting. There is also the convenience that two elements are more easily controlled than three. This is especially an advantage when arrangements are made for interlocking of cost and financial accounts, and will be considered later. We have seen that the expenses, direct and indirect, may be incurred as debits from suppliers or sub-contractors. Such are transit charges, royalties, dock dues and other possible direct expenses, and rent, rates, insurance, property and plant repairs, etc., and other indirect expenses. All these outside expenses can be accounted with suppliers' invoices and included with the element of material, and thus be entered in a monthly purchase journal, with a corresponding abstract, summarising all outside supplies for direct and indirect cost purposes. The other items of travelling and incidental expenses may be accounted as petty cash, but a summary of this can be added at the end of purchase journal monthly, and included in that abstract. The remaining items of bank or other interest and annual depreciation can be transferred by the general journal, the former to profit and loss account, and the latter to departmental trading account if desired.

The remaining factor in the sales price is profit. Prime cost plus factory oncost, i.e. departmental and general, gives the total production cost which, plus sales oncost, gives the total cost, and this plus profit desired gives the sales price. It is perhaps a small point, but it is better to base the profit percentage on the sales price instead of on the total cost. Although both these base figures will vary, the same amount of profit will be a lesser percentage on sales price than on cost, in any case whatever basis is adopted must be rigidly maintained, otherwise confusion will ensue.

## CHAPTER III

### EXAMINATION QUESTIONS

1 Differentiate between prime cost, factory cost, final or total cost, and sales price

2 What precisely is embraced in the term, final or total cost, should the profit percentage be based on this or the sales price, and why?

3 Briefly explain how you would audit the details of the two chief elements of prime cost in a manufacturing business, and the methods you would adopt to test the accuracy of the results

4 What do you understand by the terms 'direct material' and 'indirect material'? Give six examples of each and state in what circumstances either or both may be transposed

Inter, I C W 4, 1940

5 What would you suggest should be the functions of an internal cost auditor?

Final, I C W A, 1943

6 Give an example of a stock card designed to cover all features of stock control, including quantities and values

Inter, I C W A, 1945

7 What are the main features to be considered in a cost audit? Should these be continuous or periodical? State your reasons

Inter, I C W 4, 1945

8 Select an industry and list the periodic cost statistics which you consider would be of service to the Managing Director. Indicate the purpose each is intended to serve and the frequency of the presentation

Final, I C W 1, 1945

9 Three essentials of a system of costing are —

(a) to provide a means of controlling expenses

(b) to indicate product profitability,

(c) to serve as a guide to Management in the determination of policy

Outline the practical issues of costing under each of the three heads

Final, I C W A, 1945

## CHAPTER IV

### COSTS OF MATERIALS

From the consideration of costs elements it will have been evident that materials generally, whether for actual manufacturing or incidental to manufacturing, as well as the resultant stocks of manufactures partly finished or finished and raw materials, are all a very important part of cost accounts. Materials required for actual manufactures are requisitioned by the officials or departments responsible for specifying these requirements. This may be done for departmental or process costs by a works superintendent's department, or these requisitions may come direct from the actual manufacturing departments. Special materials for job or order costs are usually requisitioned by the design or drawing office, after approval of the drawings prepared from the specification accompanying the signed contract. All these requisitions are used, by the buyer or purchase department, as the basis of official orders for the actual supplies required, after quotations from possible suppliers are obtained to decide where the order can be placed most favourably.

Manufacturing material for stock, special materials for definite jobs and orders, as well as sundry supplies for operating requirements, are all purchased in the same manner. These consignments are invoiced by suppliers and receipt is certified by the users in the usual way. This is generally by works' departments completing receive note, which is returned to purchase department to be compared with the suppliers' invoice. The receive note is usually a blank copy of the invoice giving only particulars of the consignment for identification purposes. The receive note requests that the accounting be given by weight or unit used for invoicing, so that an actual examination of the consignment has to be made before the quantity received can be correctly stated.

#### STOCK MANUFACTURES AND STOCKS

Accounting of stocks, whether manufactures or stores, is very essential for complete cost accounts. In purchasing the procedure is similar, whether special materials for definite jobs, stock

manufacturing materials or stores are required. In like manner, the accounting of stocks of manufactures or stores is accomplished in a uniform way, and applicable for all these stock requirements. Generally, these instances show what is best practice for successful operation of cost accounts, that one method should be made to satisfy more than one purpose when possible. This guidance regarding standard methods is also applicable to books, cards and forms that may be necessary for cost accounting. The less variety there is in style, size, and essential details for completion, the more success will be achieved by these books and documents. All the accompanying specimen forms throughout are from actual practice, and as a further simple guide for size it may be mentioned that no size less than 5 in. by 3 in. card should be used, and everything designed as simply as possible. All forms used should be clearly titled to show what they are. Instances are known where forms have been marked, "This is not an enquiry but an order," and "This is not an order but an enquiry," such remarks on forms should not be necessary.

#### STOCK CONTROL

The efficient control of stock which may be manufactures, partly finished or finished, or raw materials, can be accomplished readily with the minimum of clerical work in the actual stock departments. The accounting required for complete control of stock is comparatively little for the benefits obtained, after a proper method has been installed. The clerical work necessary for complete accounting is practically confined to the stock clerks in the cost office, who have charge of the stock ledgers.

The preliminary work necessary for thorough stock accounting largely consists in the preparation of a classified list of parts or materials to be stocked, and this may be termed a stock catalogue or register. For manufactured stock parts, these classification particulars will be readily obtained from the parts list or price list, which many makers of technical manufactures, such as type-writers and motor-cars, have to provide for their customers. Form 3 is a specimen stock record of manufactured parts, for use in stock department, where cash values are not required. Stock materials and stores will be classified alphabetically by their trade name, for example, red lead and white lead

will each likely be classified separately under lead, with the further classification red and white. This will probably be the practice of both makers and users for these, especially if the latter use large quantities. Paints are likely to be classified separately by make according to colour and quality, but, if users require only small quantities of a few varieties, it may be satisfactory to classify all under the general heading of paints. In such cases issues are satisfactorily valued on the average price basis, because of the small variation there is in the purchase prices, and the foregoing are reasonable suggestions for the classification of stocks for accounting purposes.

#### STOCK REQUISITIONS AND LEDGERS

All stocks are in charge of a stock-keeper or storeman, in the actual stock department. Stock requisitions, for the replenishment of manufactured parts, are issued by the stock-keeper to the manufacturing department concerned, and, for purchased supplies, these requisitions are for the attention of the buyer or purchase department, as previously explained. All issues are made by stock departments on receipt of foremen's requisitions, which may come from despatch or shipping department if for manufactured stock, or from foremen of operating departments if for raw materials and stores. The stock departments are responsible only for certifying receipt of supplies, by completing receive notes as previously explained, and also for the completion of foremen's requisitions, by stating thereon quantities supplied in fulfilment of these requests.

The valuation of all stock supplies and issues is accomplished by the stock accountant in the cost department. This is controlled by stock ledgers, classified according to parts and materials stocked. Debits to stock departments, for replenishment of manufactured parts, are made from the stock requisitions which are returned by manufacturing departments to the stock accountant, showing parts supplied. These are debited to stock department, and credited to manufacturing department usually at cost price. Debits for purchased materials are made from supplier's invoices at purchase prices after quantities and calculations have been certified.

Issues of stock parts or materials to jobs or departments, are valued for cost purposes at true average prices of supplies as contained in the stock ledger. An example is as follows. If

100 articles or 100 lbs of material have been purchased and debited to stock at an average price of 1s each, and 100 more at 2s each added to the stock, after 50 of the first lot have already been used at 1s each, the new average price is not 1s 6d, but 1s 8d per article or per lb. A record of receipts and issues in quantities only, for the same stock classifications, can be made in the actual stock department bin or record cards. The stock ledger is a perpetual check on these quantity transactions, and in addition gives a continuous valuation of stocks on hand at any time. Individual transactions can be summarised in scroll abstracts, for entry in stock bin cards or stock ledgers.

#### STOCK ACCOUNTS

If complete stock accounts are operated throughout the year in a manufacturing concern, and include particulars of all prices of supplies, and account all receipts and issues, the estimated stock valuation can be obtained periodically if required, and at the yearly balancing period. Adjustment of values is necessary at the annual balance period. It is the best practice to use then, for valuation purposes, the purchase or current market prices, whichever are lower.

Periodically during the year these book returns, which can be obtained from complete stock records, may be readily checked with the physical stock returns, as shown by Interim Stock Report, Form 4. If the differences are thoroughly investigated, it is sometimes possible to obtain satisfactory explanations of unexpected waste or leakages. When complete stock accounts are operated, preparatory arrangements can be readily made which will greatly facilitate the annual physical stock-taking, and considerably reduce the time required for this purpose. If these arrangements include preliminary instructions to works' departments, where they are responsible for their own stock-taking, valuable assistance is thus given, to ensure accuracy and speed in the annual stock accounting.

When complete stock accounts are not operated continuously, comparison of the annual returns for several years usually reveals differences in quantities and qualities of stock, the variations generally being due to the nature of the work produced. A specimen Form, No. 5, is shown for this purpose. Perpetual stock accounts give this information when required, and it is most useful to ensure that all stocks are normal, and that sup-

plies are properly controlled, otherwise there may be waste or an unnecessary financial burden. When stocks have been thoroughly reviewed with regard to current requirements, by means of Form No. 5, it has been found sometimes that accumulations of certain supplies covered requirements for an abnormal period. Further financial obligations and waste in this respect were thus avoided.



## CHAPTER IV

### EXAMINATION QUESTIONS

1 What utility tests should be applied to the designs of costs forms?

What do you consider to be the main essentials of material control?

*Inter, I C W A, 1938*

2 Do you consider that, for costing purposes, material should be charged out at cost prices or market prices? Give reasons for your answers

*Final, C A (England) 1939*

3 Suggest reasons for discrepancies between quantities shown in the Stores Ledger and actual quantity in stock, which are discovered as the result of "continuous stock taking"

*Final, I C C A, 1939*

4 What are the arguments for and against the use of the following methods of pricing stores issues —

(a) Original Cost

(b) Average Cost

(c) Market Price

(d) Standard or normal cost?

Can you suggest any other methods?

*Inter, I C W A, 1940*

5 In what circumstances, if any, would you advocate the keeping of a Stores Ledger —

(a) by monetary values only,

(b) by quantities only,

(c) with the monetary values and quantities for all transactions?

*Inter, I C W A, 1940*

6 If you were asked to prepare a monthly Trading Account and Balance Sheet, by what means would you determine the value of Stocks and Work in Progress?

*Final, I C C A, 1940*

7 Materials issued from stores to a certain job are found to be surplus to the requirements. What objection is there to passing such materials to another job and assuming this practice is followed, by what system or by what method should the transfer be effected?

*Inter, I C W A, 1941*

8 During periods of rapid increase or decrease in prices of materials used in production, which of the following methods of pricing stores issues results in the most accurate cost of goods manufactured and sold —

- (a) First-in, first-out method,
- (b) Actual cost method,
- (c) Average cost method,
- (d) Last-in, first-out method,
- (e) Standard cost method?

Give reasons in support of your answer

*Inter, I C W A, 1943*

9 A stores record is required to show —

- (a) the order position,
- (b) the physical movement of goods in and out of stores,
- (c) goods pre-allocated to jobs,
- (d) the available stock

Design a card and illustrate the method of operating by two or three specimen entries

*I C W A, 1944*

10 Frame instructions to stock-taking personnel as to the procedure for taking year end stock.

This will include stores, raw and unfinished, and work in progress. Your answer should be in the form of a memorandum to the persons concerned.

What special arrangements would you make for goods received but not inspected, and how would you control the despatch of finished goods during the stock-taking period?

*Final, I C W A, 1945*

## CHAPTER V

### LABOUR COSTS

There are various methods of computing wages and subsequently accounting labour cost in industrial establishments. These are adopted to suit the conditions in the particular manufacturing business to which they apply, and as may be decided by the management concerned. This does not mean that all manufacturers in the same trade have the same wage system in operation. Manufacturers engaged in the same production sometimes organise their work differently, and use different wage methods which also necessitate different organisation.

All wage systems are really based in some way either on the time the worker is engaged at work, or on the amount of the work done by the worker. These two basic principles are often modified, so that there are different arrangements of time and work methods of computing wages, as well as other premium and bonus systems of wage payment. Wages methods based on the amount of work done, or the time taken to do certain work, are generally classified as systems of payment by results.

The time method of computing wages is based on a rate per hour, day or week, for each worker, but usually it is a rate per hour. This is generally the minimum rate agreed to by the Trade Union concerned, for each class of labour in a particular district. The principal objection to the time method of computing wages, is that it does not encourage the worker to do his utmost to increase output, as he has no guarantee that he will obtain an increased wage, in accordance with any increase in his production. In another way, the same objection has been made against the minimum trade rate, that the better or best workers receive only the same wage as the less able workers. The services of the best workers are, however, likely to be retained longest in times of depression, and promotion to better positions is usually made from those who do the best work.

#### SPECIAL WAGE ALLOWANCES

There are, of course, additional wages paid in the time method for working beyond the usual working day. The rates are

usually increased to time and half for ordinary overtime, except on Sundays and certain holidays, when double time rate is paid for the hours worked. Time workers on night-shift are usually paid time and third for time worked, and in some instances special night-shift allowance is also given for each night worked. Special travelling allowances are usually granted, to workers engaged on work at places some distance from the usual workshop, these travelling allowances increase in approximate ratio to the distance the place of work may be from the workshop. Special allowances are sometimes paid for dirty work, particularly on repair jobs, where work has to be done frequently under arduous conditions.

The foregoing wage allowances are indicative generally, of what has been arranged between various Trade Unions and the employers for special conditions. These or similar allowances are given, although the wage payment may be by time work, piecework or premium bonus. Detailed consideration of piecework and premium bonus will later occupy our attention, but before doing this labour cost accounting, for all systems of wage payment, will now be outlined. There are vocations in all industrial establishments which will always require to be paid by time rate. This category includes most of those called non-producers, as staff men are sometimes named, such as powerhousemen, gatemen, storemen, factory clerks, charge hands and foremen, and also workers engaged on special manufacturing and repair work, including buildings and plant.

#### LABOUR ACCOUNTING

The real basis for accounting labour cost is either job or work lines or a hand time record book, and this applies to all methods of wage payment. In like manner, material accounting which we considered has as an accounting basis, either the purchase material requisition for special requirements, or the foremen's stock requisition, if supplies are obtained from manufacturer's own stock. Job or work lines as per specimen Form No. 6 are sometimes used for time work, although these are not usually necessary unless for piecework and premium bonus. A job register and a job data book, which are essential for labour payment by results, could also be used with advantage for time work, although this is not usual. Forms 7 and 8 are specimens of these as used. Briefly, the job register is analogous to the

stock material or stock parts catalogues, and enumerates all standard jobs or work to be done. The job data book covers all the particulars obtained from the execution of jobs and work, and may be likened to the material stock or bin card. Generally, all the afore-mentioned functions are concerned with quantities only of time and material, and not with their corresponding cash values.

The most useful basis for labour accounting of time work is a hand labour record book, so called because it is suitable for use at the actual place of work. It can be ruled for details of two workers' jobs on each page for one weekly pay period, with columns for each day of the pay week, as shown by Form 9. It is usually used at least daily and completed weekly, for balancing with the actual wages book for the corresponding pay period. Details of the jobs or work done can be obtained, from foremen, charge men, or the actual workers themselves, by the time keeper or wages clerk during his duly visit. He also acts as a check on the job information reported, if he has sufficient practical or technical knowledge to do so, and thus prevents possible leakage and waste of time. All details reported in labour cost accounting or in material accounting are not always correct, and these are the occasions where practical knowledge has the greatest opportunities for increasing efficiency in cost accounting.

#### LABOUR COST RECORDS

Whether time work is reported by job lines or hand labour record book, if for a large number of workers it has to be summarised by labour classification according to jobs, by means of a scroll abstract, for most efficient accounting. This gives the total hours for each class of worker, according to the job or job section on which work has been done during that particular pay period. These totals are entered for each period in labour cost book, Form 10. The total hours accounted, for each class of labour against all jobs, will therefore equal the total in the wages book for that pay period. If the wages book is arranged with each class of labour kept distinctly separate, the wages paid for these total hours is readily ascertained, and if the amount is divided by these hours a true average rate per hour is easily obtained. Specimen entries in the wages book are shown by Form 11. The values of overtime allowances are

shown separately and can be charged to production accordingly, to show the cost of overtime working. This limits the labour hours in cost and oncost accounts to actual working hours. Labour for oncost jobs is accounted and valued in the same way as for production cost accounts, and the same average class rates for each pay period are used for both purposes.

If all hours accounted, for each class of labour charged to jobs in that pay period, are valued at these average rates, the total cost, of each and all classes of labour in the labour cost book, will agree with the wages book for the same period. Money allowances for travelling, repair work, etc., are of course abstracted and summarised in cash. As time rates for each class of workers do not vary much, the foregoing method for cost accounting hours worked at average rates is the most efficient, where a large number of workers are employed. This only entails a fraction of the time occupied in accounting each individual worker's hours to jobs, when these are valued at the individual time rates.

## CHAPTER V

### EXAMINATION QUESTIONS

1 Distinguish between direct and indirect labour, state your reasons

What are the principal difficulties in accurate charging of labour to cost accounts?

State how you would deal with these

2 What are the general circumstances which render labour payment by results desirable or undesirable respectively?

3 In a works employing more than 2,000 hands what method or methods of numbering the employees would you propose? Explain what purpose such numbering would serve

Inter, I C W A, 1936

4 The present week of 47 hours, and the differential rating, i.e. base rate plus national bonus, present many difficulties in calculation and operation. What modifications would you suggest if a 40 hour week were introduced?

Inter, I C W A, 1936

5 What are the principal items which appear on a daily time report? Draft a specimen copy

Inter, I C W A, 1938

6 Draft the necessary forms to record workers' time and charge same in the Cost Accounts in a Factory where each job is entered under a separate number

Final, A C C A, 1939

7 In what manner is the efficiency of a factory affected by —

(a) Time lost due to late arrival and absence

(b) Idle or waiting time?

Inter, I C W A, 1940

8 You are instructed to investigate the costs of a light engineering company relating to a contract for machining 10,000 small castings which is nearing completion. The company is

*engaged on other contracts of a similar nature On enquiry you are informed that no analysis of labour costs as between the various contracts has been made*

*Explain how you would proceed in your investigation and how you would deal with overhead expenditure*

*Inter, I S A A, 1944*

9 (a) *Draft a wages sheet with four specimen entries with columns for deductions, and indicate the Impersonal Accounts to which the totals should be posted*

(b) *It is usual to fix maximum and minimum quantities for various lines of stock What factors should be considered in fixing these figures —*

*(a) for standard lines, and*

*(b) for exceptional lines?*

*Final, I S 4 A, 1944*

10 *Define productive and unproductive time in relation to costing Indicate methods by which the unproductive time can be allocated in cost accounts, giving examples of their application to (a) a manufacturing business, and*

*(b) a profession*

*Inter, C A (Eng), 1945*

11 *State, with reasons, the possible effects on costs of a reduction in working hours*

*Final, I C H 1, 1945*



## CHAPTER VI

### LABOUR PAYMENT BY RESULTS

When considering methods of wage payments by results it is necessary to remember that the object of such systems is to pay workers according to ability or output produced, and also to reduce the production cost incurred by the employer. To determine which system will most successfully accomplish this, very careful account has to be taken of the manufactures to be produced or the work to be done. Systems at present in use, for payment of defined jobs by results, may be generally divided into two classes, excluding payment on the basis of total output, or total profits of an entire plant or company. A brief description of some of these job systems, and their practical problems, will help to make their differences clear, and indicate the nature of the production for which they are most suitable, in paying labour by output obtained and in reducing cost.

#### PIECEWORK

Any system of piecework rates represents one class of payment by results, in which the worker is paid a fixed price for the work done, regardless of the time taken to complete it. Any reduction in cost to the employer, by piecework rates, is obtained only by the intensity of the production. This reduction in cost is not in direct ratio to the increased output obtained in a certain period, because oncost does not decrease directly in proportion as output is increased.

#### PREMIUM BONUS

The premium bonus systems represent the other class of payment for defined tasks by results. The uniform feature of these premium bonus methods is, that the worker is guaranteed at least his ordinary time rate for the hours worked, whether bonus is earned or not. In all premium bonus systems, a definite time in hours is allowed for the work to be done. The worker is paid the ordinary time rate for the hours worked, plus a bonus or share of the value of the hours saved, and the remaining share is for the employer. The basis, for determining

the bonus, varies in the different premium systems. Time allowances for journeymen can also be used for apprentices, but only a percentage of the time worked by the latter is accounted when determining the time taken for computation of bonus earned.

The principal premium bonus systems, used in this country, are the Halsey-Weir and the Rowan. If we assume the following data for a job, we can compare the particulars for calculating the bonus in both these systems. Time allowed, 100 hours; time taken 90 hours; time saved, 10 hours; ordinary time rate, 1s per hour.

*Halsey-Weir.* In this system, the worker receives as bonus the value at ordinary time rate of half the number of hours saved. These bonus hours can be determined by the formula —

$$\frac{\text{Time allowed} - \text{time taken}}{2} \text{ or simply } \frac{\text{time saved}}{2} = \text{bonus}$$

hours which at time rate gives bonus

Example —

100—90	10		s	d
————	01	= 5 hrs at 1s = bonus of	5	0
2	2			
Time wages, 90 hrs at 1s			90	0
			—	—
Total actual cost			95	0
			==	==

Estimated cost, 100 hours at 1s = 100s

*Rowan.* In the Rowan system, a worker receives as bonus the same percentage of the value at ordinary rate of the time taken, as the time saved bears to the time allowed. So that, if the worker saves, say, 10 per cent of the time allowed, he is paid a bonus of 10 per cent of the ordinary wages earned in doing the job. Expressed in another way, this means that, as the worker saves one-tenth of the time allowed, he is paid his time rate plus one-tenth for the hours worked.

As the worker usually earns bonus of different percentages during one pay period, it was found unnecessary, in the Rowan system, to use these various inclusive time and bonus rates per hour for the different jobs to compute wages, or to ascertain

labour cost In practical use the bonus hours in this system are easily calculated, and when added to the hours worked, all are valued at ordinary time rate for wage calculation, or labour cost accounting The formula for determining these bonus hours is as follows

$$\frac{\text{Time taken} \times \text{time saved}}{\text{Time taken} + \text{time saved}} \text{ or simply, } \frac{\text{Time taken} \times \text{time saved}}{\text{time allowed}} = \text{bonus hours which at time rate give bonus}$$

Example —

$90 \times 10$	$90 \times 10$	900		s	d
<hr/>	or <hr/>	<hr/>	= 9 hrs at 1s		
$90 + 10$	100	100	= bonus of	9	0
Time wages, 90 hrs at 1s				90	0
Total actual cost				<hr/>	<hr/>
				99	0

Estimated cost, 100 hrs at 1s = 100s

Another premium bonus method used in this country grants the worker a standard value for each hour saved, say 6d per hour, regardless of the number of hours he saves This is equivalent to awarding the worker a uniform share of the value of each hour saved, as in the Halsey-Weir system If the worker's ordinary time rate was 1s per hour, a uniform or standard bonus of 6d for each hour saved would represent 50 per cent which is the fixed share awarded as bonus by the Halsey-Weir system

The Halsey Premium bonus, the 40 per cent Gantt bonus, and Emerson efficiency bonus systems are used in America, and a brief description of these is as follows

*Halsey* — This is similar in principle to the Halsey-Weir, of which it was the forerunner, but the Halsey system only allows the worker one-third of the saving as bonus, in place of the Halsey-Weir bonus of one-half of the saving

*Forty per cent Gantt* — In this system a defined task is allowed a certain time for completion, and it is only likely to

be accomplished by the best workers in the time given. This time allowance, at ordinary time-rate, is virtually a piecework price for the job. This is paid with the addition of a maximum bonus of 40 per cent of that price, if the job is finished in the time allowed or less. If the time allowed is exceeded, no bonus is paid, but only a time rate for the hours worked.

*Emerson Efficiency System*—This is similar to the 40 per cent Gantt system, but the maximum bonus awarded is only 20 per cent of the estimated price, if the job is completed in the time allowed or less. A smaller bonus is earned if the time taken to complete the task does not amount to 50 per cent more than the time allowed. The bonus of 20 per cent is paid if the job is completed in the time allowed, but this bonus decreases directly until the time taken exceeds the time allowed by 50 per cent when no bonus is awarded.

#### PREMIUM BONUS METHODS

The desire for payment by results, for a variety of engineering and manufacturing jobs and operations occupying several days or weeks, has brought into use these various premium bonus systems, to increase production and reduce cost. Piecework rates are not suitable for these larger jobs of varied nature, as the prices cannot be estimated sufficiently accurately to prevent possible serious loss to the employer, through inaccurate rate fixing.

The Halsey-Weir, Rowan, and Halsey Premium Bonus systems fix their time allowances on the ability of the average worker, under ordinary conditions. They each guarantee the worker his ordinary rate at least for the hours worked, and award a premium dependent upon the time saved. The premium is awarded in the Rowan system on a distinctly different basis from the others, as already explained, and as will be observed from the following figures:

Time allowed in hours	100	100	100	100	100	100	100	100	100
Time taken in hrs	90	80	70	60	50	40	30	20	10
Time saved in hrs	10	20	30	40	50	60	70	80	90
Halsey-Weir— Bonus hrs ( $\frac{1}{2}$ of saving)	5	10	15	20	25	30	35	40	45
Rowan— Bonus hrs (% of saving)	9	16	21	24	25	24	21	16	9
Halsey— Bonus hrs ( $\frac{1}{3}$ of saving)	3 $\frac{1}{3}$	6 $\frac{2}{3}$	10	13 $\frac{1}{3}$	16 $\frac{2}{3}$	20	23 $\frac{1}{3}$	26 $\frac{2}{3}$	30

## HALSEY-WEIR AND HALSEY SYSTEMS

It will be observed, from the foregoing figures, that in the Halsey-Weir and Halsey systems, the bonus hours awarded increase regularly with the increase in the time saved. At 10 hours taken, the bonus hours are respectively 45 and 30, so that the total payment is respectively 55 and 40 hours for 10 hours work. This means that the worker would receive, for this job in these systems, respectively  $5\frac{1}{2}$  and 4 times his usual wage.

## ROWAN SYSTEM

The foregoing figures show that, in the Rowan system, the bonus hours regularly increase from 9 to 25 and decrease to 9. In the first example, 9 bonus hours are earned with 90 hours worked, giving a total payment of 99 hours for 90 hours taken. In the last example 9 bonus hours are earned with 10 hours worked, giving a total payment of 19 hours for 10 hours taken. Although the bonus hours earned are nine in both examples, these are earned very much more quickly in the latter instance, when the hours taken are only 10, so that the worker's total wage per hour is always increased as the time taken is reduced. In this latter example, the worker's ordinary hourly rate is increased by 90 per cent for the time taken. This is a reasonable figure, compared with the increase to  $5\frac{1}{2}$  and 4 times the ordinary hourly rate, as given by the Halsey-Weir and Halsey systems respectively, for the same time taken.

The Rowan system gives the worker a larger premium bonus, for the reduction he is likely to make on the time allowed, namely, up to 50 per cent, or in other words to double output. The Rowan system also safeguards the employer, as the worker cannot possibly earn double his wages, no matter how liberal the time allowance has been, or what error has been made in estimating it. This obviates entirely the necessity for reducing the time allowance, unless the method of manufacturing has been entirely altered. It is right to emphasise that this principle has been rigidly adhered to by the employers using premium bonus systems.

## GANTT AND EMERSON EFFICIENCY SYSTEMS

The Gantt bonus and Emerson Efficiency systems award their premium on the attainment of exceptional ability, but this is not a sufficiently encouraging basis for the average worker.

These systems would probably be suitable only for such as cupola or furnace operations of casting or forging. The expenditure for starting up and maintaining such plant during operations may be reduced, per unit of production, if abnormal outputs are obtained during a certain period. For such operations, where a certain high output or difficult task has been accomplished, it may prove profitable to adopt a bonus method similar to the Gantt and Emerson Efficiency bonus systems.

#### PIECEWORK PRICES

It is possible with automatic machine work and intense repetition, for example, in producing bolts, studs, etc., or the production of stampings, to estimate piecework prices which may prove as suitable as premium bonus for payment by results. This is only likely where the operation is almost entirely machine work, and repeated many times in one hour or day. In such cases, the efficiency of the machine is likely to be more important than the skill of the worker. These conditions permit of the piecework prices being accurately estimated, so that the employer will know approximately the worker's possible earnings for good ability and increased output. These accurate piecework prices should ensure that the rates will not give double the usual earnings or more, as such abnormal wages should not be expected from any payment by results. Employers and workers, in certain trades, have agreed that an increase of one-third over ordinary time wages is a reasonable expectation from labour payment by results.

#### PRODUCTION COST

With payment by piecework prices, the production cost of the work is stationary. Any reduction in the manufacturing cost can only be effected by less oncost being incurred per unit or piece, because of the greater output obtained in the same period. Increased output from machine and hand workers usually necessitates increased oncost for floor space, machine and hand tool maintenance, and general labour for transporting and handling production.

The accompanying graphs, Forms 12 to 17, with explanatory note on each, show for comparison the results of these different systems of payment by results, namely, piecework, Halsey-Weir, Rowan, Halsey, 40 per cent Gantt, and Emerson

Efficiency systems Each graph shows where the reduction by  $\frac{1}{4}$  or  $\frac{1}{2}$  of the total labour cost is accomplished, by the decreased time taken for the job

The saving to the employer from premium bonus, compared with piecework, will be very evident from these graphs In piecework systems, the employer undertakes to pay a fixed price for the work done, regardless of the time taken to complete the job It is possible for the worker to increase his wages to double or more, in piecework, Halsey-Weir and Halsey systems The Rowan graph shows the safety of this system to the employer, in the event of the time allowance being abnormal, as the worker's bonus must be less than 100 per cent of the wage cost of the time taken for the work done

#### LIKELY DIFFICULTIES

A system of payment by results, to satisfy the employer and the workers, must recompense the employer for any extra expenditure incurred for plant improvement, extra jig and tool supply, extra help and accommodation, etc., necessary to accomplish the increased output The system must guarantee the skilled worker his trade minimum wage, and also enable the semi-skilled or unskilled worker to earn what is termed a reasonable living wage In all the foregoing systems, except piecework, the worker is guaranteed his time rate for the hours worked The system should not permit the worker to earn double or more than double his usual or standard earnings, exclusive of overtime allowance, etc., but the worker must be awarded increased wages for every increase in output over the standard adopted

#### BENEFITS OF PAYMENT BY RESULTS

One of the principal benefits of piecework or premium bonus, compared with other schemes of profit sharing, is that the workers receive their extra earnings as soon as they are made, that is on the first pay-day after completion of the job This is much more satisfactory than asking them to wait until some later date for their financial gain Systems of piecework or premium bonus give immediately the award earned by individual or squad efforts, which is much better than bonus on total output, or on profits of the company which are only known at the end of the financial year Another practical benefit, from operat-

ing payment by results, is that the efficient collection of data necessitates standard labour jobs being clearly defined for manufacturing, and especially for repetition work. This is to ensure uniformity in all references to manufacturing operations, cost accounting and record books. The adoption of standard labour jobs prevents waste of time in manufacturing and usually shows the necessity of standard cost arrangements for all manufacturing, including material, labour and oncost. Standard cost methods assist considerably in the actual production arrangements and manufacturing efficiency.



## CHAPTER VI

### EXAMINATION QUESTIONS

1 *Distinguish between straight piecework and premium bonus systems of payments by results Give details of any premium bonus system*

2 *What are the objections to premium bonus systems of labour payment from*

- (a) *The employers point of view,*
- (b) *The employees point of view?*

3 *What particular advantages are obtained by operating the Emerson efficiency system of labour payment?*

4 *What are the general conditions or production circumstances which are beneficial for the successful operation of profit sharing schemes for employees?*

5 *When operators are working on jobs alternating between day work, piecework and premium bonus tasks, how would you provide for an adequate check on the time recorded?*

*Inter , I C W A , 1938*

6 (a) *Describe briefly, the premium, or bonus, plan for the remuneration of labour with particular reference to the Halsey and Rowan Systems*

(b) *Calculate the earnings of a worker under the Rowan system from the following particulars —*

*Hourly rate of wages (guaranteed) is 6d*

*Standard time for producing one dozen articles is three hours*

*Actual time taken by worker to produce twenty dozen articles is 48 hours*

*Final, C A Scotland, 1940*

7 In what respects does straight piecework differ from other systems of incentive wage payments?

What do you consider to be the essential characteristics of any particular job or operation for it to be paid for on a straight piecework basis?

*Inter, I C W A, 1940*

8 In most industries the Premium Bonus System is an accepted method of wage payment. Define the bases of calculation employed in,

- (a) Plain Premium Bonus System
- (b) The Rowan Premium Bonus System
- (c) The Halsey Premium Bonus System
- (d) The Halsey-Warr Premium Bonus System

*Inter, I C W A, 1940*

9 Make a comparison of the following methods of remunerating labour, showing their respective effects upon production, production costs and the expense of operating the wages office —

- (a) Day work with output bonus,
- (b) Piece Rates,
- (c) Premium Bonus

*Inter, I C W A, 1944*

10 For a job which can be done in 15 minutes by an average worker, illustrate several different methods of payment by results and show the cost each for each method when the job is done in 10 minutes

*Inter, I C W A, 1943*

11 (a) Explain a system of payment of wages

- (i) On the piecework system,
- (ii) On the bonus or premium system

and state in what way they differ from the time system

- (b) Point out any advantages which are in the bonus system

*Final, C A (Eng), 1944*

12 Compare the Halsey and Rowan premium bonus systems, explaining their similarity and differences

*Inter, I C W A, 1944*

## CHAPTER VII

### ONCOST ACCOUNTS

Oncost may be defined as the expenditure properly applicable to products or goods, whether costed by departmental or job method, to cover the proper share of the works and selling expenses which cannot be allocated direct to the cost of the manufactured product. Other names used in place of oncost are "burden," "charges," "overhead," or "operating expenses." The expression oncost is apparently as suitable as any other, and in this country is generally acceptable as quite descriptive of these expenses. As previously indicated, these have probably been named oncost because the allocation of the expenses to the production is usually based on some portion of the prime cost. As we will observe later there is, however, another method of allocating oncost to products or goods, on the basis of the amount or quantity of production or of goods merchanted.

#### WORKS ONCOST

Works oncost may be considered as the expenses incurred in maintaining and operating a manufacturing establishment, and usually include packing and delivery expenses, if these cannot be accurately accounted as prime cost. The axiom for differentiation between prime cost and oncost is that all expenses possible should be charged as prime cost if these can be accounted accurately and conveniently. Thus delivery expenses for large products such as ships, engines, boilers, machinery, etc., can be accounted as prime cost of the contract, when this is possible.

#### SALES ONCOST

Sales oncost represents the expenses incurred in the disposal of the product, and might be termed sales cost. It is only on very rare occasions that this can be accounted accurately and conveniently as prime cost of a particular job or order, and consequently all such expenses are usually distributed as sales oncost. It is difficult to account selling expenses as prime cost, because the sales organisation is rarely engaged, entirely or in clearly defined sections, with the selling of a definite job or order.

## ONCOST CLASSIFICATION

Classification of works and sales oncost is also a problem when the same administrative staff, consisting of principals, managers, clerks, etc., with the necessary office accommodation, is engaged in the control of manufacturing as well as selling. Compromise is therefore inevitable, as it is difficult in such cases to make a clear division of these expenses into works and sales oncost. Industrial establishments, engaged on special production to definite enquiries, have very little selling expense compared with manufacturers of domestic or universal products. These modified sales organisations may only consist of an estimating department and publicity section, and the selling expenses in such cases are usually regarded for convenience as works oncost. It is of course possible in accounting all oncost to keep the expense items separately as may be desired, and so estimating and publicity expenditure can be indicated by itself if this is warranted.

## FIXED AND FLUCTUATING ONCOST

Oncost incurred in the maintenance of an establishment, whether for manufacturing or selling, is generally regarded as fixed oncost. This consists of rent, insurance, rates, depreciation, lighting, heating, watching, cleaning, and such items as property repairs which may be necessary although the establishment is idle or only partly operated. In like manner fluctuating oncost is incurred by manufacturing, or in operating an establishment, and by the sales organisation in actual handling of goods, and this also covers the business transactions of the usual retail merchant. Fluctuating works oncost therefore largely consists of expenses for using property and assets efficiently for manufacturing. This includes power and consumable supplies necessary for production, as well as indirect labour, and the expenses of supervision, wages of foremen, storemen, clerks and other officials.

## ONCOST ACCOUNTING

Efficient accounting of oncost is accomplished by having all these expenses properly classified and regularly reported either weekly or monthly, so that fluctuations will be readily indicated and opportunity given for the necessary enquiry. Expenses incurred in the fulfilment of guarantees given for material and

workmanship of products manufactured can also be included as an oncost item. It is not practicable to have job or order cost accounts open until the expiry of the guarantee period, which may be 6 or 12 months after completion of the product.

Apart from the oncost expenses already indicated, the following are specimen fluctuating oncost items —

Property repairs, which would be increased by operating an establishment, plant repairs, tools upkeep, and the extra depreciation essential for these when utilised. Consumable supplies for manufacturing which largely consist of waste and cleaning rags, machinery oils, soaps, etc. Interest on capital invested in property is sometimes suggested as an oncost item, but many companies consider the ownership expenses, for owners' rates and the necessary depreciation, are sufficient in lieu of rent, when they own the property. Interest on plant values, if accounted as oncost, differentiates between the cost of operating machinery, according to capital value of the equipment involved.

Sales oncost, apart from the fixed expenses for rent, insurance, rates, etc., largely consists of staff salaries and travelling expenses, catalogues and press advertising, etc. Sales organisations are sometimes very extensive and the selling expense may be greater than the production cost. Special divisions to sales oncost would be necessary in such cases, to obtain information applicable to certain selling areas, departments or products, but generally sales oncost when accounted separately is accomplished in one section.

#### ONCOST JOURNAL

Works and sales oncost when properly classified is readily accounted in an oncost journal, generally having one page for each expense item and a line for each month of the financial year, with possibly several columns each representing a year all in one page. This gives an admirable summary of oncost as incurred, and if desired a remarks column can be added for brief explanations when necessary. Works oncost, especially for departmental or process manufactures, can usually be accounted as departmental oncost and general oncost, by the same procedure as indicated, a particular section or a separate journal being used for each department. When the oncost for each department is ultimately allocated to the production of that

department, there is a further allocation for general oncost to all manufactures

#### DEPARTMENTAL AND GENERAL ONCOST

Accounting of oncost departmentally as well as generally is not so practicable or desirable for large job or order costs, as the extra work involved in allocating departmental oncost to such manufactures is not warranted by the information obtained. This is especially so where the ultimate product is the work of all departments, and may not always be produced in the same sequence. Audit requirements, for costs of products for national contracts, are usually satisfied with accounting by the general oncost method only. A segregation of fixed oncost to departments for the maintenance of property and assets, is readily accomplished on a reasonable basis. The basis is property by floor area, and plant and tools by capital values involved, and this covers insurance, rates and depreciation as well as lighting and heating. The fluctuating oncost expenses for power consumed and property and other repairs as well as consumable supplies, can generally be accounted directly to departments concerned, or accounted on an agreed basis similar to those indicated for fixed oncost.

## CHAPTER VII

### EXAMINATION QUESTIONS

1 *Draft a form to show monthly for management purposes, the various general oncost or overhead expenses and give some headings or titles of these expenses*

2 *State briefly the methods you would adopt to obtain a monthly schedule of departmental oncost or overhead expenses*

3 *During a period of depression, your directors advance the argument that fixed expenses will be incurred, whether or not the factory is producing, and propose to quote on the basis of eliminating these expenses from the cost*

*Discuss the position and indicate on what lines you would advise the directors to proceed*

*Final, I C W A, 1938*

4 *State the sources from which you would calculate amounts to determine total overheads, and the nature of the expenses you would calculate from each source*

*Final, I C W A, 1940*

5 *Distinguish between factory overhead and administration overhead. Give a statement designed to control the latter, and indicate on broad lines the allocations you would make to bring the various items concerned into your costs*

*Inter, I C W A, 1940*

6 *It has been contended that exceptional expenses falling into any one costing period should be charged direct to Profit and Loss Account rather than recovered in current overhead charges. Give your own views on the principles involved and cite examples which will illustrate the main aspects of the problem*

*Final, I C W A, 1940*

7 *Describe steps which will ensure that Expense Accounts will be constantly built up to provide information for the efficient regulation of overhead recovery rates. Formulate your answer*

*from the viewpoint of Cost Department routine and mention the industry to which your ideas will have particular application*

*Final, I C W A , 1940*

8 Explain why it should be considered necessary to use separate overhead rates for each of several departments rather than one general rate for all departments of a factory.

*Inter, I C W A , 1943*

9 A company with branch factories and subsidiary companies spends large sums of money on capital expenditure and the maintenance of plant and buildings. The main Board of the Parent Company meets monthly and wishes to exercise control over this expenditure in all factories. Outline the system you would instal, bearing in mind that occasions arise when urgent work (breakdowns, etc.) must be carried out without delay.

*Final, I C W A , 1943*

10 In analysing Indirect Wages charged in overheads, you find that the following have been included —

- (a) Wages on building additions to canteen,
- (b) Wages on repairs to factory structure,
- (c) Wages on repairs to heavy machinery,
- (d) Wages on foundations of new machines specially erected for Government contracts

*Comment on these items*

*Inter, I S A A , 1944*

11 Give your understanding of the following terms —

- (a) Fixed Overheads,
- (b) Variable Overheads,
- (c) Production Unit,
- (d) Manufacturing Overheads,
- (e) Pre-determined expenditure,
- (f) Departmental expenditure,
- (g) Indirect material

*Inter, I C W A , 1944*

12 Ten per cent of a company's total cost is incurred in a large Development and Research division. What control should be established over this expense? Discuss how this expense should be recovered in computing total production costs.

*Final, I C W A , 1945*



## CHAPTER VIII

### ONCOST ALLOTMENT

The allocation, allotment or distribution of oncost to cost of production of goods, is equally important to the accounting of oncost, if accurate total costs are desired. Useful information can be obtained from proper oncost accounts, by comparison of returns for individual items for definite periods, and by comparing oncost totals with totals of prime cost or labour costs for the same period. If oncost accounts are to function fully and properly, the distribution of these accounts to the production or goods costs must receive very careful consideration, according to the nature of the manufactures.

If we search in other spheres for an analogy to oncost allotment we may not find a perfect simile, but can certainly obtain confirmation of the importance of oncost allocation. Although there is no prime term applied to oncost in accounting, we have a useful illustration of the application of oncost if we think of the function of steam, one of the chief prime movers, to use a mechanical term. Steam is not generated to test the safety of stop valves of a boiler, or to blow the steam whistle of an engine or ship, but is usually applied to move pistons and so operate the engine. Steering gear in vehicles or ships, to take another illustration, is not devised solely for control or turning movements, but to ensure full use of the complete unit in accomplishing specified journeys or voyages in the minimum time. Accurate oncost application to costs, in like manner, is essential to ensure maximum efficiency in producing and handling goods.

#### ONCOST DISTRIBUTION

If we review the principal oncost items—rent, rates, insurance, depreciation, power, light and heat, property and plant repairs, tools upkeep, salaries and wages of so-called non-producers, we observe that generally these are incurred according to time. This is the period the establishment is used or the plant is utilised in manufacturing. Time therefore does seem likely to be an equitable basis for the allotment of oncost and so it is, because it is the most largely used.

The time basis is generally used for oncost allocation, not

only because of its equity, but also on account of the simplicity of this method. Time can be used in various ways for oncost application, but the principle is the same in the different methods, namely, that oncost is incurred in direct ratio to the time required for the work done.

#### LABOUR COST METHOD

The most general basis for oncost allocation is that of labour cost, so that if we account the total oncost for a department or complete establishment, the formula would be

$$\frac{\text{Total Oncost} \times 100}{\text{Total direct Labour Cost}} = \text{Percentage of direct labour cost to be used for oncost}$$

$$\text{or } \frac{£2,500 \times 100}{£2,000} = 125\% \text{ of direct labour cost for oncost}$$

This method does not take account of the different classes of labour employed, whether machine or hand workers, skilled or unskilled, journeymen or apprentices. Differences are not observed in this method for machine cost compared with hand labour, or for wage rates of journeymen and apprentices, and these differences may be considerable in some industries. If outdoor labour is employed extensively this oncost rate should be accounted separately, as it is likely to be much less than the oncost rate for indoor workers.

#### LABOUR HOURS METHOD

A similar basis to the foregoing can be used if we know the number of direct labour hours for a definite period in each department, or in the whole establishment. Having the corresponding total oncost accounted the formula is

$$\frac{\text{Total oncost}}{\text{Total direct labour hours for all direct labour}} = \text{The oncost rate per hour}$$

$$\text{or } \frac{£2,000}{30,000 \text{ hours}} = 1s. 4d. \text{ per hour for oncost}$$

The direct labour hours are usually accounted for labour cost purposes, except when wage payment is by piecework, but this additional information can easily be recorded, and a more satisfactory oncost rate obtained.

The labour hours method does not differentiate usually

between machine and hand workers where marked variations occur. These differences are not so great between classes of hand labour such as journeymen and apprentices, skilled and unskilled, for as we have already observed time is the principal factor in incurring oncost. The necessity previously mentioned for separate oncost rates for outdoor workers, when extensively employed, is equally apparent when direct labour hours basis is used, as in the direct labour cost method.

#### MACHINE ONCOST

As a development of the direct labour hours basis for oncost allotment, the machine oncost method has been adopted, where machinery is extensively used for manufacturing. The unit for machine oncost allocation may be a complete department if all the machines are similar, or a battery of the same class of machines, or one machine tool only. It is essential for accuracy to limit the unit to the same kind or class of machine tools. A specimen Form No. 18 is given for accounting and allotment of machine oncost. The hourly rate of operators should not be included in the machine oncost rate. The operator's rate is usually production cost, and different rates may be paid to certain operators.

In all cases the method is the same, as an estimate is made of the working hours for a definite period. The corresponding oncost expenses are segregated according to floor space for rent, rates, lighting, heating, etc., and for insurance, depreciation, repairs, tools, upkeep, and superintendence, according to value of plant employed.

The formula is

$$\frac{\text{Total oncost of Unit or Machines}}{\text{Estimated Operating Hours}} = \text{Oncost rate per hour}$$

$$\text{or—} \frac{\text{£1,000}}{10,000 \text{ hours}} = 25 \text{ p per hour for oncost}$$

When the actual operating hours differ from those estimated the oncost may be under or over-absorbed, but this only affects cost accounts without disturbing the financial accounts, and variations can be shown on the machine oncost records.

The machine oncost rate is the most accurate for machine work. A similar method can be adopted for all or different

classes of hand workers, but considerable preparatory work is always necessary for this method. Machine oncost rates are principally used on mass production, and not generally utilised for large job or order products for special contracts, which entail the work of the whole establishment in proper sequence.

#### PRIME COST METHOD

Oncost allotment to production in industrial establishments was originally principally on the basis of prime cost. This is analogous to the method of the ordinary retail merchant, who endeavours to recover oncost by a percentage on purchase prices or cost. Merchants have no labour cost except perhaps for packing and despatch, which is really oncost, and so a suitable oncost formula in such cases is

$$\frac{\text{Total oncost} \times 100}{\text{Total cost of Goods Factored}} = \text{Percentage to be added to purchase prices for oncost}$$

such as

$$\frac{£750 \times 100}{£5,000} = 15\% \text{ for oncost}$$

The prime cost basis for industrial establishments is similar, thus —

$$\frac{\text{Total Oncost} \times 100}{\text{Prime cost of Total Production}} = \text{Percentage to be added to prime cost for oncost}$$

or—

$$\frac{£1,500 \times 100}{£5,000} = 30\% \text{ on prime cost for oncost}$$

This method while satisfactory for retail merchants has serious defects when applied to manufactures. If the complete unit, such as buildings, ships, engines, locomotives, tramcars, motor vehicles, includes finished fittings or parts purchased ready for assembling by the principal contractor, practically no workmanship will be expended on these except for fitting. In the prime cost method these incur oncost according to their purchase value. This defect is also observed in the prime cost method if two items of like nature are compared, which consist of materials entirely different in value. A ship's propeller of bronze will cost approximately five times that of a cast-iron

propeller for the same vessel, and the labour cost for machining and fitting either of them will be practically the same. Because of its value the bronze propeller will incur about five times the oncost allotted to a cast-iron propeller, in this prime cost method of oncost allocation.

#### PRODUCTION METHOD

Certain expenses incidental to casting and forging of metals, if regarded as oncost can be consistently related to the weight or quantity produced, rather than to the direct labour for production. Such minor casting or forging expenses as rumbling, pickling, annealing and plating which are processes for dressing and finishing, can be allotted on a weight or quantity basis. Similar prime cost or oncost expenses for sawing, drying, storage and wastage of timber, as well as coating operations in paper-making, can be allotted on the basis of quantity produced. This method is also adopted sometimes for consumable supplies, such as cutting compounds or lubricants in mass machine production. When such labour payment is by piecework, the workers in some cases are charged with these supplies, the cost of these being accounted in the piecework price for manufacturing. As the worker has to pay according to consumption, he has naturally every inducement to economise.

Specimen Forms 19 and 20 show the yearly accounting of oncost, general and departmental, for convenient comparison yearly. Oncost allotment is given on labour cost and also on output.

#### ONCOST PERIODS

Oncost allotment in cost accounting necessitates much more approximation than is necessary in accounting prime cost of materials and labour, but if done consistently the results from successive periods enable improvements to be made in oncost allocation. Generally these approximations have to be based on previous monthly, quarterly or yearly periods. Allowance has to be made for the fixed oncost, which will be incurred irrespective of production, and for the variation in fluctuating oncost likely to occur, according to the expected rate of production. Accountancy ability has a fine field in this respect in industrial establishments, and the more care and trouble there is exercised in the exploration of it, the greater will be the accuracy of the resulting costs obtained for the manufactures produced.

## CHAPTER VIII

### EXAMINATION QUESTIONS

1 *Why is direct labour hours for manufacturing a more logical basis of applying oncost or overhead expenses to production than direct labour cost?*

2 *State briefly the various methods of applying oncost or overhead expenses to prime cost or part thereof*

3 *To what extent do you consider it is necessary to account for piece-worker's time on individual jobs?  
Give reasons for your answer*

*Inter, I C W A, 1937*

4 *What method would you introduce into your works to assist in controlling indirect labour? Prepare chart showing how you would report from month to month the measure of control*

*Inter, I C W A, 1937*

5 *Explain why it is normally inadvisable to include machine operator's wages in the machine hour rate used for overhead expenses recovered. Make your meaning clear with calculated examples*

*Inter, I C W A, 1938*

6 *Draft a report to the directors of a manufacturing concern wherein the method of applying overheads is by means of a percentage rate on direct labour. Outline the disadvantages of this method and indicate your recommendations for complete revision*

*Inter, I C W A, 1938*

7 *Discuss the general question of recovering of overheads, where the output, owing to war conditions, has been greatly reduced*

*Final, I C W A, 1940*

8 Prepare a complete statement for arriving at a machine hour rate. How is this affected by subsequent periods of "Idle or Waiting Time?"

Final, I C II 1, 1940

9 Administrative overheads had formerly been recovered as a percentage of the total materials, labour and expenses. Due to restricted supplies, the Government issued as a free issue part of the materials required to meet a contract. What method of recovery would you now use?

Assume that the value of the free issue is considerable. Set out a statement showing the relation of the present to the former method.

Final, I C IV A, 1941

10 Where the maximum mechanical equipment is used for the cheapest labour and the minimum for the dearest labour, in both instances to produce the same result, detail how you would absorb overheads for each class of labour.

Inter, I C W 4, 1943

11 A number of machines of the same function and capacity were installed at different dates extending over a period of years. How would this factor affect the preparation of machine rates? Discuss whether a high rate of overhead is an indication of inefficiency.

Inter, I C W A, 1943

12 The treatment of overheads in the Cost Accounts involves collection to determine the extent of expenses and the absorption for the purpose of determining production costs. Describe the principles you would apply for

- (a) The collection of overheads,
- (b) The absorption of overheads

Inter, I C W A, 1944

13 With examples, show how the measure of production efficiency can be obscured by inappropriate methods of overhead expense allocation.

Final, I C IV A, 1944

14 *In a shop where the only practicable method of applying overheads is by means of a percentage on labour, it is found that the same job may be done by workers paid at very different rates. Comment on this and suggest a method to overcome it without the introduction of an hourly rate.*

*Final, I C W A, 1944*

15 *The management of a certain factory desires, for the sake of simplicity and economy, to retain the system of recovering overhead expenses by applying a percentage to direct labour cost, but is aware of the risks of inaccuracy. What proposal would you make to comply with the wishes of the management and yet afford more accurate results? What factors govern the practicability of the proposal?*

*Inter, I C W A, 1945*



## CHAPTER IX

### INDUSTRIAL COSTS

An eminent accountant, who held a national position as Controller of Factory Audit and Costs, has put on record that, "a costing system could not be formulated unless the accountant knows something about works organisation and that was one thing accountants' education failed to do." This can be supplemented by what it implies, that not only is a knowledge of works organisation essential for accurate costing, but also a complete knowledge of the product obtained and the method of production. This applies particularly where the cost concerns buildings, bridges, motor vehicles or other technical units. The accountant is not then in a position to obtain accurate costs or take the responsibility of this work, unless he has a thorough knowledge of the quantity, nature and function of all the proper parts of the complete article or job, and is thoroughly familiar with the process of manufacture.

#### WOOD PACKING BOXES

This technical knowledge is soon acquired when the product consists of only a few parts of one or two kinds of material, the output in such cases usually being obtained by what is termed "mass production." A typical example is the production of wood packing boxes. The parts consist of two sides, two tops and bottoms, two ends, fitting sticks and packing sticks, all of white pine, and with the necessary nails and 27 wire gauge hoop for binding. All these supplies are taken from manufacturer's stock at the factory. The price values of these issues have been considered in stock material accounting. The quantities of wood required for each part being known for the different sizes of box, as the output of parts or boxes is reported, the material used can be readily calculated and valued for cost purposes. This also applies to the nails and hoop required.

#### MARINE BOILERS

If we take another illustration such as the production of marine boilers, we find that although not a complex technical unit the cost accounting of these, whether single or in numbers, requires care-

ful arrangement and rigid application of the principles adopted

After consideration of the attached cost sheet from actual cost book, Form 21, and cost and estimate comparison, Form 22, the arrangement will be clear to anyone having ordinary knowledge of boilers and their production. The sectional arrangement is quite distinctive (1) "boilers" is for the bare boilers (2) "smoke box and funnel" is the super-structure for draught and escape of smoke (3) "boiler fittings and mountings" is for the inside fittings, and mountings mostly outside the boiler which are principally for water and steam supply (4) "sundries" is for delivery charges and incidental expenses. The abstract is a summary of the cost sections to obtain cost of complete boiler.

The principal materials for production of boilers are specified by design office from approved drawings, and made to special specification for each order. These material requisitions are used by the buyer or purchase department, as already explained, to obtain these special materials for each order, which are charged direct to each cost account from suppliers' invoices. As a distinctive feature between plates for boilers and plates for smoke box and funnel, it can be emphasised that those for boilers are very much thicker as they have to stand the specified steam pressure. Before being used such plates are passed by the surveyors to whose inspection the boilers are made, either Board of Trade, Lloyd's Register, British Corporation, or a similar concern. As the plates for smoke box and funnel are light and not surveyed they can be supplied from boiler-makers' own stock, and this procedure can also be adopted for other materials, which are not subject to survey.

#### LABOUR AND ONCOST

Accounting of labour and oncost, to the fore-mentioned examples of costs and others of process or job costs, will be explained in due course. The object meantime is to show how, in the final arrangement of technical costs, all items are accounted in their proper place for greatest usefulness on all occasions and final cost purposes.

#### DEPARTMENTAL OR PROCESS COSTS

Although definite nomenclature has been considered for cost expressions and terms by the Institute of Costs and Works Accountants, the general use of some of these in many trades

has apparently given them permanent importance. For all practical purposes cost accounts may be classified into either of two methods, one of these being departmental or process method, which is sometimes referred to as comparative cost, machine cost, multiple cost, operative cost or product method. Departmental or process more correctly explains the scope of this method as the basis of cost is usually a particular department or certain departments, and the manufactures produced are frequently the result of definite operations or processes. Specimen Form 23 is shown for costs involving more than one process.

These processes of manufacture may occupy some time and also follow each other in definite sequence, and a detailed cost can frequently be obtained of the different stages of production. Departmental or process methods are generally applicable when manufacturing is continuous for regular periods of time, so that the units produced lose their identity and become part of the total production. There are many industries clearly covered by this definition, and although they may not be strictly called manufacturing trades, the mining and quarrying of minerals, clay, sand and stone are industries where costs can be obtained by this method. Generally the manufacture of foodstuffs, flour milling, bakery products and clothing, as well as confectionery and tobacco trades, illustrate the use of departmental and process cost, and so also do paper mills, calico print works, thread makers, linoleum and carpet factories, print and varnish works, rope works, chemical manufacturers, dyers, tanners, and some times also wood box makers and furniture factories. In these industries production is likely to be continuous and largely repetition, although classes and grades of products will vary, but the resulting output is largely the outcome of mass production. The cost per unit is obtained by dividing the total cost for the period by the units produced in that time. Pig-iron makers and others producing metal ingots, steel works producing blooms, ingots, plates and bars, foundries on repetition work, metal rolling mills and tube works, are all industries where departmental or process costs may be operated. It may be that in the case of foundries, rolling mills and tube works, another method of accounting by job or order will be preferable but this depends largely on the particular product being obtained. A hard and fast rule cannot always be stated for some industries in cost accounting, as the nature of the product must

always receive due consideration, and the quantities, sizes and classification of manufactures vary in the same trades

#### JOB OR ORDER COSTS

Job or order costs comprise the other method of cost accounting for manufacturing trades and this is sometimes known as contract cost, single or unit cost, special order or terminal cost. It is quite clearly described as the job or order method, because the job or order or contract for the work is the definite basis for accounting cost. This means that the product is for specific or special requirements, and is frequently covered by a particular specification as well as a signed contract. Accurate and prompt cost accounting of such manufactures, necessitates complete technical knowledge of the product as covered by the specification, to ensure that all important cost details can be verified during production and on completion of the work.

Constructional work, whether buildings, bridges, wharfs or docks, as well as shipbuilding, engineering, boiler-making, production of locomotives, motor vehicles, rolling stock, electrical plant, machine tools and other products of metal, also wood working and other industries, are instances where job or order costs are required. It may be thought that the modern practice of building houses, with a substitute of steel or composition for stone, suggests rather a process of construction, but the process if so called is confined to the preparation of the materials and not to the actual operation of building. If desired, the cost of steel, ferro-concrete or other substitute can be accounted by process method, but these would then become materials or supplies for the ultimate construction, which is essentially accounted by job or order costs. The suggestion for practical cost account sections for buildings would include such as masonry and stone work, divided into foundations and walls, steel structural work, joiner work with divisions for floors, windows, doors and roofs, plaster work, electrical work, plumber work, etc. Cost sections on similar lines have been used for a long time in other industries, such as shipbuilding, engineering, etc. In some of these trades producing standard manufactures and having accurate cost of such repetition jobs, costs of sundry stores and supplies for definite jobs are accounted from the particulars previously obtained, by an average percentage on prime cost, with out loss of efficiency.

## CHAPTER IX

### EXAMINATION QUESTIONS

1 *What are the advantages of uniform methods of costing as applied to a specified industry?*

*What initial interest and organisation are necessary to develop a uniform system of costing in that industry?*

*Final, I C W A, 1935*

2 *Discuss process cost and specific order systems, and show the principal differences between and similarities in the two types of systems, stating the reasons for such differences and similarities*

*Inter, I C W A, 1937*

3 *Do you consider, for purposes of cost accounting, that it is essential in all cases to keep detailed records of each individual lot of every product? Illustrate your answer by giving examples of whether you think this should or should not be done*

*Final, I C W A, 1937*

4 *Indicate the various methods of ascertaining costs, and outline the particular factors which determine the method most suitable for any industry*

*Inter, I C W A, 1940*

5 *You have been instructed to investigate the cost figures of a concern carrying out a contract on a 10 per cent profit basis. Describe the lines upon which you would proceed and outline the main points upon which you would expect difficulties*

*Final, I C W A, 1940*

6 *In the course of manufacturing sheet metal aircraft components, an engineering company on M A P sub-contract work accumulates quantities of scrap and defective work. Outline a system of accounting control, bearing in mind that the materials used are of free issue from the main contractors, but are to be*

credited with the sum realised for such scrap and defective work  
Indicate how the loss on scrap and defective work should be shown in the cost accounts

Inter, I S A A, 1944

7 Name and define the four principal systems of costing. Describe the types of business to which each would apply

Inter, I S A A, 1944

8 The Managing Director of a small manufacturing concern consults you as to the minimum price at which he can sell the output of one of the departments of the company, which it is intended to mass produce in future. The company's records show the following particulars for this department for the past year

Production Sales	100 Units
Materials	6,500
Direct Labour	3,500
Direct Charges	500
Works Oncost	3,500
Office Oncost	1,400
Selling Oncost	1,600
Profit	2,500
	<hr/>
	£19,500

You ascertain that 40% works oncost fluctuates directly with production and that 70% of the selling oncost fluctuates with sales. It is anticipated that the department will produce 500 units per annum, and that direct labour charges per unit will be reduced by 20%, while fixed oncost charges will increase by £1,500. Office oncost and fixed selling oncost charges are expected to show an increase of 25%, but otherwise no changes are anticipated. Prepare a statement for submission to your client.

Final, C A (Scotland), 1944

9 Into what "types" are costing systems usually grouped? State the nature of the undertakings to which each type is most suitable, with two examples of each.

Inter, C A (Eng), 1945

## CHAPTER X

### DEPARTMENTAL OR PROCESS COSTS

Departmental or process cost accounts may be generally likened to manufacturing or trading accounts for certain departments or processes during definite periods, with the additional information accounted of the total output for that period. Although production may be measured in standard units there is much desirable and valuable information that cannot be obtained from the most extensively detailed trading account. It is a further evident weakness, in any cost arrangement, that necessitates waiting for cost particulars until the expiry of the usual trading period. Unless there is information supplementary to the usual trading account, the effect of prices paid for purchased material or supplies cannot be determined on current costs, and this is a much more important factor in production costs than some accountants realise. It is only possible to obtain from the usual trading account the total figure per unit produced for direct labour or indirect labour, so that the direct labour cost by trade classification or part operation is not available in this way. Indirect expenses or oncost can only be allocated to production, from a trading account, by the direct labour cost basis or on the units produced, but the direct labour hours basis may be the most equitable.

#### COSTS IN FINANCE ACCOUNTS

The use of the ordinary profit and loss account to obtain the total cost of production, can only be accomplished by allocating general oncost to production either on the direct labour basis or by production units. These general oncost items, like the departmental oncost items in the trading account, may be allocated separately on either of the bases mentioned, or can be allocated in total as general oncost. Direct labour hours are usually the most equitable basis for oncost allocation of manufacturing cost and this cannot be accomplished from the usual trading account or profit and loss account without supplementary information. The use of the ordinary balance sheet for cost accounting is practically confined to determining the values of

property and assets and liquid capital used, or which may be necessary, for most economical manufacturing.

Apart from the limited usefulness and lack of detailed cost information obtained from these usual commercial accounts, a fairly accurate gross cost per unit of production can be obtained in this way, for a simple manufacture. This result may be possible when the product consists of one class of material or a small variety of materials and is manufactured in one size, with the employment of only a few classes of direct or productive labour. Departmental or general oncost allocation from the commercial accounts, by the direct labour cost basis or on the units produced, being the only methods there possible may be fairly satisfactory in such instances. These conditions can only operate for departmental or process costs.

#### PROCESS COST SECTIONS

The cost details necessary for departmental or process methods are usually much less in number than those required for job or order costs, but the number and nature of the details necessary is entirely determined by the manufactures produced. For the production of wood boxes or packing cases, process costs for material and labour would be summarised on the basis of principal constituents of the article produced. Material and labour cost would thus be obtained for the production of the parts, say—two sides, two tops and bottoms, two ends, fitting sticks, packing sticks, nails and hoops. Departmental or process costs for foundries would be for castings of the same material and metal would be debited as produced by the cupolas or furnaces, the procedure being similar for ferrous and non-ferrous products. The direct labour cost for the actual castings can be readily obtained, if classified, for example, as pattern making, moulding, trimming, grinding, machining and labouring.

#### ESTIMATED COSTS

Apart from the actual cost accounting of manufactures, there are modified cost methods which have been used without completely detailed accounting, especially for departmental or process costs. One of these is the estimate cost method, and is suitable for simple manufactures where the cost elements of material, labour and oncost, can be estimated for the complete unit. The material stock and work in progress at the beginning and end



of the trading period, as well as the units produced during the period, are all valued for these elements on that estimated cost basis. This valuation is only for cost accounting. Material, labour and oncost is debited as incurred, during the period, i.e. as charged by suppliers' invoices, labour cost and oncost debits. Differences are observed by comparisons of costs and estimates for each element and entail a revision of the cost estimates. For simple manufactures useful cost information is obtained in this way, without all the work entailed for complete detailed cost accounting, as will be observed from Form 24. A departmental annual balance is shown for this estimate cost method, as per Form 25.

#### STANDARD COSTS

Another method has been used for departmental or process costs when it was not considered advisable to inform manufacturing departments of the actual purchase prices for materials and supplies. In order to show total costs, these supplies are debited to departments at fixed or standard prices. This confines the manufacturing efficiency to labour economy in production, which is reasonable, as production departments are not responsible for purchasing efficiency. Actual costs for the production obtained in this manner, can be obtained at any time in the responsible cost department, where current material purchase prices are always available.

Form 26 gives annual balances summarised for several departments, where output is credited at production cost.

## CHAPTER X

### EXAMINATION QUESTIONS

1 *Prepare in schedule form a process cost summary, including direct material, direct labour and oncost, and involving the production of two consecutive departments*

2 *In devising a cost system what is the object of basing the system on definite operations or processes?*

3 *Describe what is known as the Estimate Cost System. State the advantages and difficulties of this method*

4 *What is Process Cost? Name three industries in which it is used and describe the system as practised in one such industry*

*Inter, I C W A, 1935*

5 *State as concisely as possible why it is advisable to audit, or examine, at periodic intervals the cost system of an organisation*

*Final, I C W A, 1937*

6 *In support of the claim that, for the effective interpretation of costs, comparisons must be made with some measuring standard, state some standards which could be used and the principles contained in each*

*Final, I C W A, 1940*

7 *Discuss the problem involved in the costing of products made by processes which also produce a large number of by-products*

*Final, I C W A, 1941*

8 *Discuss the valuation of by-products, and the effect of the method of valuation on the cost of the main products from which they are derived*

*Inter, I C W A, 1945*

9 Prepare a specimen cost sheet for an industry of your own choice, employing process costing and producing by-products in addition to the main product

Final, I C II A, 1945

10 You are asked to value work-in-progress at the end of a financial year. Over the period of the year, direct wages have risen, causing the overhead percentage to fall considerably, although overheads themselves have increased slightly over the year. In the first month of the year, the ratio of overhead to labour cost was 175%, and this was gradually reduced to a figure of 135% during the last month. How should work-in-progress be valued? Discuss this problem, bearing in mind that the overall production time of the finished products is 25 weeks.

Final, I C IV A, 1945

## JOB OR ORDER COSTS

If an industrial establishment is producing manufactures entirely to definite jobs, orders or contracts, it is advisable, when installing cost accounts for these, to adopt a method for the accounting which will be equally applicable for all the manufactures. This necessitates a very careful survey of the trade and general requirements of all these manufactures for production purposes, as well as for cost accounts. If a general method for cost accounting such products is applicable and can be rigidly adapted, attention can then be given to the essential cost details required for correctly accounting each particular manufacture.

An advantage is obtained by the adoption of a uniform method of cost accounting in one establishment producing various manufactures. It is not only likely to be more quickly installed and correctly operated, but it will probably continue to be more efficient, than if different methods of cost accounting were used for different manufactures. The size of the average modern industrial establishment and the amount of production obtained therefrom, does not usually permit the cost accountant to actually do all the detailed accounting.

## UNIFORM METHOD

If a uniform method of cost accounting is applicable in one establishment, all the detailed accounting of the material, labour and oncost by the assistants required, as well as the necessary accounting assistance from other departments, is likely to be accomplished more satisfactorily. The cost accountant does not control the technical department in specifying the material requirements, or the buyer in purchasing supplies, or the cashier in settling suppliers' accounts and paying the workers' wages. For the efficient working of his department, he has to ensure that in the general scheme of these departments full and proper provision is made for the cost accounting requirements.

There are other advantages to be obtained from a uniform method of cost finding in one establishment, where this is supplementing other imperfect methods which may have been in

operation previously. Such alterations and education of assistants already mentioned have to be accomplished gradually, and are likely to be more quickly and correctly effected if only one new method is being introduced instead of several. For the installation of a new cost method, it is advisable to concentrate on the accounting of one cost element at one time, say, direct materials, or maybe direct purchased materials, then direct stock materials. Afterwards direct labour, oncost accounting, and oncost apportionment, and total costs, can be considered and finally all the cost accounting may be expedited to secure results promptly.

#### MARINE ENGINES AND BOILERS

The production of marine engines and boilers provides an opportunity for considering a uniform cost method for accounting costs of the complete unit. These are for different classes and sizes of ships, and to definite jobs, orders or contracts. A general survey of such production will readily suggest the natural division of the products into machinery and boilers, as being of an entirely different nature, they are produced in different departments. Further consideration of these main divisions will suggest the necessary cost sections, which are essential in each for accurate accounting of prime cost materials and labour. Cost sections have also to be provided for accounting installation cost, as contracts for engines and boilers usually cover the fitting of these on board ship, and the working of them during the trial trip, for the complete fulfilment of the contract.

Cost divisions and sections used for such manufactures are as follows —

##### Machinery

- (1) Main engines
- (2) Propeller and shafting
- (3) Engine-room gratings, ladders and platforms
- (4) Mountings and fittings for main engines
- (5) Sundry expenses
- (6) Auxiliaries, including special fittings
- (7) Pipes and connections
- (8) Winches
- (9) Extra spare gear

- (10) Patterns and drawings
- (11) Wages fitting machinery on board

#### Boilers

- (12) Forced draught
- (13) Main boilers
- (14) Smoke box and funnel
- (15) Main boiler fittings
- (16) Main boiler mountings
- (17) Stokehole gratings, ladders and platforms
- (18) Sundry expenses
- (19) Donkey boiler complete
- (20) Wages fitting boilers on board

Each cost section includes the principal items required for the manufacture and completion of that particular section of the product. The determination of standard cost sections and section items of technical manufactures, requires full knowledge of the product and the cost requirements, as these are the actual headings in the cost books for accounting material and labour costs, as shown by Forms 21 and 22. Specimens of these items which comprise section 1—main engines, are as follows —

Iron castings, brass castings, gunmetal castings, steel castings, piston rods, connecting rods, crank shaft, white metal, smithy forgings, and sundries

Similarly all the various sections include the detailed items necessary for accurate cost accounting, and their corresponding headings in the actual cost books. For accounting and estimating requirements, as well as for ensuring the highest efficiency, it is essential in the cost books to account separately the principal entries which comprise each item of each section, and show from where these entries emanated, Form 21. Specimen entries for item 1—iron casting, of section 1—Main engines, are as follows

Cylinders, sole plates, columns, condenser, pistons, slide valves, air and feed pumps, eccentric pulleys and straps

Similar entries are made in the actual cost books under the various section items, and the source may be either suppliers' invoices, as in the aforementioned, or stock material debits for iron, steel, wood, smith's forgings or general stores issues. Direct labour costs are entered from labour cost record or labour cost book, Form 10, and oncost from oncost journal or oncost

allocation account For each job, order or contract, the cost books have the necessary detailed entries to each item of each section These are available for proper verification before completion of final costs, and for ultimate reference at any time, including full particulars of the source of entry

#### TECHNICAL COSTS

For all classes of technical manufactures, a general principle can be indicated for the deciding of the separate detailed entries necessary for accurate cost accounting The importance and value of these details, in relation to a complete section of the complete product, is the outstanding factor which determines the relative importance of these The correct selection of these is proof of the technical knowledge of the cost accountant This also applies to the selection of the main cost divisions and sections, as all the technical details of each product have to be carefully studied to obtain the best arrangement for the necessary cost accounts

The foregoing arrangements have referred only to the cost accounting of these complete units, i.e. sets of engines and boilers, but naturally makers of these frequently receive orders for only part of this complete equipment These part orders might be for engines only, or boilers only, when the remainder of the complete unit is obtained elsewhere Orders are also received for replacement parts of engines and boilers, and also for repair work to such equipment These orders are sometimes classified as special orders or jobbings, to distinguish them from orders for complete units Minor parts for complete units are sometimes made for stock as convenient, by makers of these complete units, such as pumps and special cocks and valves for engines and boilers, and these are usually termed stock orders

#### COST ACCOUNTS

Orders for complete units, i.e. engines and boilers, are generally known as contracts orders for boilers only as boiler orders These and special orders or jobbings, and also stock orders, are all numbered numerically in their classification, and known thereafter by their number in the cost and other accounting books The arrangement in the cost books for each particular order includes only the necessary headings for that particular equipment, guidance for these headings being obtained from

the actual specification for the work to be done. Special cost books are usually used for each class of orders, and the ruling of these books may differ, but the method of accounting material, labour and oncost, is uniform for all classes. All costs can be quickly and accurately accounted and be obtained with the same promptitude. As indicated such accounting arrangements are uniform and equally applicable to all manufacturing departments including drawing office, pattern shop, foundries, machine shops, fitting and finishing shops, smithy and boiler works. This applies for all contracts, jobs and definite orders, as the same cost sections and details as may be required are used throughout.

The foregoing arrangements are applicable to other industries where costs are accounted by job or order method. They are also suitable for cost accounts of new buildings and plant, which is accomplished with similar but separate cost books. Costs of new buildings and plant, as well as the corresponding repair accounts are also obtained by job or order method, as the work done is of special nature and definite job costs can therefore be obtained. Cost accounts of new buildings and plant are known as such and numbered numerically, but the corresponding repair cost accounts may be collective yearly, or numbered numerically when large repairs justify this special arrangement.



## CHAPTER XI

### EXAMINATION QUESTIONS

1 *Explain a method of classifying and summarising material costs, according to technical requirements of jobs or orders, and under material headings*

2 *Prepare a cost schedule for an engineering product with comparison of estimated cost, and including details of direct material, direct labour and oncost*

3 *What defects are usually found in the arrangement and assembly of costs? What remedies would you suggest?*

*Final, I C W A , 1934*

4 *Set out a final form of costs for large manufacturing units and show how you would arrange for providing sufficient detail to enable quotations to be given subsequently for replacements or spare parts*

*Final, I C W A , 1935*

5 *How would you decide whether a cost system was "top heavy" or over-elaborate? What principles should be observed in correcting this failing?*

*Final, I C W A , 1938*

6 *Prepare as completely as possible a statement showing the final form of job or terminal cost. For what purposes, other than ascertaining the actual cost of the work, can the figures be utilised, and how does this affect the form in which the information is presented?*

*Final, I C W A , 1940*

7 *A small motor engineering firm keeps complete cost records, charging the employees time from time cards to appropriate job cards. Materials used are similarly charged from stores requisitions presented to the storekeeper. The rates charged for time are those fixed by the trades association, according to the grade*

*of employees concerned and are intended to allow for oncost and profit. Materials used are charged to jobs at fixed retail prices which are 30% above wholesale prices. During the year ended 31st July, 1943, the financial books show that materials used, after adjusting for stock, amounted to £2,000 and wages to £7,000, whilst the profit for the year amounts to £220. Your client is dissatisfied with the results shown and asks you to briefly state your observations and how the results can be checked. Write a letter to him in response to his request.*

*Final, C A (Scotland), 1943,*

*8. Set out a form of cost statement for an iron foundry turning out large castings of a fairly uniform character. Assume that the labour cost can be charged to each casting but that the quality of the iron varies considerably.*

*Final, I C W A, 1944*

## CHAPTER XII

### PRACTICAL COST ACCOUNTS

Large manufacturing establishments are chiefly concerned, from the accountancy point of view, with the production costs of their manufactures as these are the basis on which estimates for work are made and selling prices arranged. The necessary cost information will ensure the elimination of waste and provide favourable estimates and selling prices which allow for profit to be made in production.

Apart from cost of manufactures, there is production work done by large concerns regularly, which is incidental to the output of the usual products of the establishment. This incidental work may be capital expenditure for buildings, plant and tools, which has to be continually renewed, replaced and extended, to satisfy the requirements of progressive establishments. Costs of this capital expenditure are equally necessary for efficient financial accounting. A review of these cost accounts and the source of their authority, as well as a summary of the origin of manufacturing cost accounts, is useful to observe the practice necessary to ensure regularity.

#### MANUFACTURES OR PRODUCTION

*Departmental or process accounts* after proper installation are generally controlled by the principal or works manager, who has the power to increase or decrease the rate of manufacture. Especially so where the output is by mass production, or the outcome of a cycle of operations from all departments. *Contracts, jobs or orders*, generally denote complete units based on customers' special requirements as detailed in the corresponding specification, such as complete buildings, bridges, ships, engines, boilers, etc. These are generally distinguished by numerical numbers in sequence, which become the cost account. *Jobbings or special orders* are also based on customers' requirements as specified and usually cover only a part, frequently for replacement, of a complete unit, but become separate cost accounts by numerical numbering. *Stock accounts* cover lesser manufactures made to stock for economy and convenience in

less busy times These may be for complete parts, say pumps, which will ultimately become a section of the larger unit, when they will be charged from stock to the major cost account, just as if obtained from an outside supplier These stock cost accounts are identified by numerical numbers, and the principal or works manager usually determines the time and quantity for such manufacturing

#### CAPITAL ACCOUNTS

*New buildings and plant*, when capital expenditure, are sanctioned by the principal or works manager The cost accounts for these are indicated numerically usually with a distinguishing prefix letter, so that the material and labour cost for producing and erecting these can be accurately accounted

#### ONCOST ACCOUNTS

*Property repairs, plant repairs and tools upkeep* are oncost accounts which are regularly operated, as repairs have to be done when required Special yearly numbers can be allotted for certain repairs, so that the classified costs of these will ultimately be known regularly, but this is a matter of arrangement Extensive or special repairs, involving considerable expenditure, are usually sanctioned by the principal or works manager These costs can be obtained separately, by allocating special repairs numbers to cover particular requirements, so that the actual expenditure will ultimately be known

#### PRACTICAL COST ACCOUNTING

Practical accounting of costs for manufactures whether by process or departmental method, or by job or order method, as well as for production and repairs to capital or oncost accounts, is always efficiently accomplished by having straightforward arrangements Costs of materials used, labour employed, and oncost incurred are reported promptly and accurately for cost accounting purposes This is a possible achievement even in the largest industrial companies and is regularly accomplished, but it takes time to instal and time to improve existing methods, if these are found unsatisfactory Considerable patience, foresight and determination are necessary, as well as the requisite knowledge of accountancy and production methods to ensure success

Undoubtedly the principal part of the task is accounting, but it requires capacity for the necessary details applicable to pro-

duction, to ensure accurate costs of large technical products, as obviously the accountant must plan the work for others to assist. The accountant must also be able to continually criticise and check the work of those assistants, as in practice errors will occur which must be found when at all possible. Manufacturing departments have usually to report consumption of stock and extent of direct labour employed for production cost accounts, and mistakes do happen in such returns. If the accountant discovers these errors and shows the necessary ability and knowledge to act as a regular censor, it is surprising how much greater efficiency may be obtained in the cost returns from the works.

#### MATERIAL AND LABOUR

Material costs for manufactures are readily obtained in a proper arrangement. Special material costs are from suppliers' invoices and stock material returns from stock requisitions, which are ultimately in daily, weekly or monthly periods, valued at average purchase prices from stock ledger accounts. If suppliers' invoices are received on delivery of special materials as they should be, these and stock material costs can be accounted when required to the actual cost accounts, say, within two days after receipt. This allows for the necessary receipt certification and proving of commercial transactions.

Direct labour hours are reported daily to labour cost clerk for ordinary time work, and usually piecework output is also reported daily. When necessary, therefore, for job repairs costs, which are frequently urgently desired, the direct labour cost can be accounted within a day after completion of the work. This would also apply to labour payment by results generally such as premium bonus methods, as immediately the job is finished the bonus can be determined and the labour cost ascertained. This implies the valuation of labour cost at average class rates, as individual rates can only be used efficiently and economically in very small establishments. Average class rates necessitate arrangement of pay roll by classes of labour employed, which is generally done, but it is the first requisite for efficient labour cost accounting.

#### ONCOST

Oncost accounting and allotment is not obtainable for interim or repair production costs, unless on the basis of previous

periods, and considerable care has to be exercised in forecasting such oncost rates. Fixed oncost must always be distributed, and fluctuating oncost may be assumed to vary directly with the amount of production, but normal production cannot be taken in all industries as full production. As an example, if total oncost is £20,000 yearly, i.e. £10,000 fixed and £10,000 fluctuating for full production, the labour cost being £20,000, this gives an oncost rate of 100 per cent on direct labour cost. If normal production is estimated at 90 per cent of full production, the normal labour cost will be *pro rata* £18,000, but the normal oncost will be £19,000, i.e. £10,000 fixed and £9,000 fluctuating, which is 105.5 per cent of normal labour cost.

This aspect of varying oncost has to be carefully considered when valuing work in progress at balance period, or in cost accounting new buildings and plant on which manufacturers are entitled to add oncost, but only at normal percentage. If abnormally high oncost is added to work in progress costs because of lack of production, the value of work in progress becomes fictitious, and much greater than it would realise if sold. Similarly, if abnormally high oncost is added to capital expenditure an inflated capital account is the result, which would not have been capital expenditure for the work, if done by a subcontractor who had secured the job in competition.

#### PROMPT COSTS

It will be observed from the foregoing that prime costs of production are regularly accounted, for material and labour to many manufacturing or costs accounts. The special material entries from suppliers' invoices are the details of the monthly totals appearing in the purchase journal, for the same cost account. Similarly stock material debits to cost accounts in detail, equal the monthly total for the same account in the stock department monthly credit abstract. Labour cost accounted by pay periods to cost accounts in detail, equals the total debit for the same cost account in the corresponding labour cost abstract, which again is the same total as the wages book total for that pay period.

This is the practice in industrial establishments operating probably twenty cost accounts, for large products occupying several months in manufacturing, and of perhaps £20,000 each in value. These have over twenty main sections in each cost

account, with an average of twelve principal items in each section of the final cost abstract. There are thus over 200 items in the final abstract of each cost account. In the actual cost books probably forty of these items will each entail twenty entries, so the total entries in the cost books may be about 1,000 for each cost account. All these entries have the source of origin stated and description of quantity, rate and value of material, and labour cost, all for ready reference as may be required, as shown by Form 21.

Monthly returns of cost incurred for special and stock materials and labour, are obtainable for such cost accounts by the 10th of the following month. This prompt accounting is equally apparent in the minimum time required to obtain total costs, on completion of the job. Practical cost accounting, to achieve highest efficiency in operation must produce prompt costs regularly during manufacture and on completion of the work, as well as provide for obtaining instant repair costs or interim accounts when required.

## CHAPTER XII

### EXAMINATION QUESTIONS

1 What are the reasons for dividing production or job orders into three classes, viz, manufacturing, capital and repairs or upkeep?

2 Indicate in detail the principal factors which determine the method of presentation of cost information to the management

*Final, I C W A, 1937*

3 Assume that you have been appointed "Cost Investigator" at a factory and state the lines upon which you would discharge your duties

*Final, I C W A, 1937*

4 Discuss the information which a well designed form of final cost should give to the management, from the point of view of production and control With what additional information should the cost figures be amplified, and how should it be given?

*Final, I C W A, 1938*

5 Cost systems do not always operate as efficiently as planned What features should be considered in examining such a system in order that it may be made to function properly?

*Final, I C W A, 1938*

6 During a period of depression, your Directors advance the argument that fixed expenses will be incurred, whether or not the factory is producing and propose to quote on the basis of eliminating these expenses from the cost Discuss the position and indicate on what lines you would advise the Directors to proceed

*Final, I C W A, 1938*

7 How would you suggest that statistical information should be given to departmental managers or foremen? What information would you give to each —

(a) weekly, and

(b) monthly

*Final, I C W A, 1939*

8 At what intervals would you propose that summarised cost accounts should be presented to the management? Detail the



*advantages and disadvantages of adopting*

- (a) a longer period,
  - (b) a shorter period,
- than the one you select*

*Final, I C W A , 1940*

9 You are instructed to make recommendations as to the method of costing most suitable for a factory which has accepted large Government contracts. State what would be the principal factors which would influence your choice of method, having in mind possible investigation by Government officials

*Final, I C W A , 1940*

10 It is a frequent complaint that cost information is presented too late for practical service. What are the main contributing causes for this condition and how would you remedy them?

*Final, I C W A , 1940*

11 What is the general reason for overheads being analysed into "fixed" and "variable"? Give three examples of items of expense in each of the following —

- (a) Fixed factory overheads,
- (b) Variable factory overheads,
- (c) Fixed distribution overheads,
- (d) Variable distribution overheads,
- (e) Fixed selling overheads,
- (f) Variable selling overheads

*Inter, I C W A , 1941*

12 A contractor has uncompleted contracts in hand at the date of his annual balance sheet. How should he appraise the value of the work in progress? How would you verify his calculations?

*Inter, C 4 (Eng) , 1944*

13 The method of ascertainment of the cost of manufacture, and the gross and nett profit in a manufacturing concern, often appears to be a debatable point. Write an essay (limited to about three pages of foolscap) setting out what, in your view, should be the guiding principles when preparing the accounts of such a concern, in order to show as accurately as possible, the profit of manufacturing, the gross profit on trading and the nett profit and its appropriation

*Final, C 4 (Eng) , 1944*

14 *A company carrying on an extensive engineering business frequently enters into contracts, many of which extend over a short period of years. In the annual balance sheet appears an item described simply as "Work in Progress," and you, as auditor, find that the amount includes profits upon uncompleted work. State clearly and in detail how you would satisfy yourself as to this asset, and what recommendations (if any) you would make to the Directors*

*Final, C A (Eng), 1944*

15 *Outline a system of Standard Order Numbers for factory internal expenditure. State their uses*

*Inter, I C W A, 1944*

16 *A company which has no asset records has an itemised valuation of buildings and machinery prepared by professional valuers every few years, based on current replacement values for insurance purposes*

*Describe what uses may be made of this information for cost accounting purposes and your views on this method, compared with that of keeping of asset records*

*Final, I C W A, 1944*

17 *A factory producing steel piping was in a vulnerable area and this fact affected output. A new temporary factory was erected in a less vulnerable area and was only used for six months, after which the whole business was taken back to the original factory. For the purpose of costing how would you deal with*

- (a) *The cost of erection of the temporary factory,*
- (b) *The cost of removal both ways,*
- (c) *The increased costs of production during the six months whilst the temporary factory was in use?*

*Final, I S A A, 1944*

18 *Where Government contracts are given out on a "cost plus" basis, what would be your general suggestions to industry to meet the requirements and ensure a reasonable profit result?*

*Final, I C W A, 1944*

## CHAPTER XIII

### COSTS AND FINANCE ACCOUNTS

The interlocking or agreement of cost and financial accounts for manufacturing trades, has received considerable attention from accountants in recent years. This has been accomplished very successfully by large companies in this country for forty-five years. If complete cost methods are operated, it is advisable to include an arrangement for agreement of cost and financial accounts, although it does not follow that the most elaborate method of doing this is the most efficient. The object of this control, as it is sometimes termed, is that as in the commercial accounts there will be one or two accounts to control the details of many others. We have a simple example of this in ordinary double entry book-keeping. The accounts of sundry creditors and sundry debtors in an impersonal or nominal ledger comprise or control, in one account, the details of many individual accounts in a separate ledger.

#### MANUFACTURING COST CONTROL

It is obvious that the usual manufacturing or trading account of industrial establishments, where complete cost accounts are not operated, may be considered as a cost control account. These trading accounts are obtained from balanced books, which account for all manufacturing expenditure. The complete control of cost accounts, when these are operated, does require some special arrangement for exact interlocking with financial accounts.

This can be effected in the usual general or nominal ledger with a minimum of four accounts, such as—purchases, labour, oncost, and production cost account, Forms 27 to 30. Purchases, labour and oncost, are debited with the expenditure incurred for these accounts respectively, and are credited as this expenditure is debited to the various cost accounts. These debits are in detail in the actual cost books and these details equal the total debits to each cost account in the monthly journal abstract for purchases, labour, and if so arranged, for oncost distributed.

The foregoing concerns the control of cost particulars in

actual cost books, by the general or nominal ledger control accounts. As already indicated a further account is necessary for complete control, and for balancing the general or nominal ledger. This "production cost account" is debited monthly from journal abstracts, with totals for materials, labour and oncost if distributed, as debited in detail in cost books. These total debits to production cost account are the same totals as credited to the control accounts of purchases, labour and oncost.

Completed production at cost, as accounted in the cost books, is credited to production cost account when despatched if desired, or at annual balance, and is then debited to sales account. As the sales account is credited with the selling prices of that production which has been despatched and invoiced, the balance of the sales account is the gross profit or loss. This interlocking method, like most others, does not permit of an actual check in the accounting of individual cost accounts, but merely ensures that all cost expenditure has been charged to some cost account.

#### FACTORY LEDGER CONTROL

If the cost accounts are for long periods or large manufactures which require several months for completion, arrangements can be made with a separate factory or trades ledger, which will control these individual cost accounts in the interlocking with the financial books. The purchase journal necessary for this arrangement is that already indicated, and which differs from the usual columnar purchase journal as each supplier's invoices have to be detailed there, with cost accounts debits *seriatim*. This is to permit of an abstract being obtained, from that journal, of total monthly debits to each cost and oncost account.

For the control of individual cost accounts, either departmental or job costs, the various cost accounts are summarised separately in the factory ledger, just as personal accounts are accounted in a creditors or debtors ledger. These separate cost accounts in a factory or trades ledger are debited monthly with expenditure, and credited with their production on completion, all as already explained. Stock material, labour, and oncost accounts are also included as required.

It is advisable to complete the factory ledger and make it self-balancing, to have a general ledger account in the factory ledger. This general ledger account is credited with all expendi-

ture for material, labour and oncost as incurred, and debited with all completed production on despatch at production cost. The credit balance of the general ledger account therefore represents the cost of stock and work in progress, as debited in the various uncompleted cost accounts, stock material, and oncost accounts, summarised in the factory ledger.

#### GENERAL LEDGER CONTROL ACCOUNT

In like manner the accounts in the factory ledger are represented in the general ledger by one account, termed the factory ledger account, which has the same figures as the general ledger account in the factory ledger, but these appear on opposite sides.

The factory ledger account in the general ledger is debited with all cost expenditure for material, labour and oncost as incurred, and is credited with completed production when despatched at the production cost. The debit balance of this account represents the cost of stock and work in progress, this being a summary, of the debit balances of the uncompleted cost accounts, stock material, and oncost accounts, in the factory ledger.

#### PRODUCTION COST ACCOUNT

It will be evident that the factory ledger account in the general ledger is practically a trading account, except that the manufactures are credited to this account at the cost of production. These are the same values which are debited to the general ledger account in the factory ledger, as already explained.

When we consider the interlocking of the factory ledger account in the general ledger, with the other accounts in that ledger, we find that another account, a production cost account, is necessary for balancing purposes. If all manufactures sold are credited to the factory ledger account at production cost, this cost will also be included in the credits to sales account, because that account is credited as usual from the sales journal with all manufactures at selling prices, as required for general financial accounts.

In this way production cost is credited twice in the general ledger, i.e. once in the factory ledger account and once in the sales account, although materials, labour and oncost for manufacturing are debited only once in the general ledger, by means of the factory ledger account. It is therefore necessary to debit

production cost twice in the general ledger, for balancing purposes. This additional debit of production cost can theoretically be made to the sales account, but this account has usually other debits for defective manufactures returned, and other allowances. It is best to make this additional debit for total cost of all manufactures sold to a "production cost account," so that the amount will always be readily traced. The total debit balance of production cost account can be transferred to sales account at the balancing period, when the usual trading and profit and loss accounts are prepared.

Other methods of cost control by finance accounts are usually variations of these indicated, but even the simplest method gives valuable information which can be readily used in cost and financial accounting. This interlocking of cost and financial accounts is particularly useful for the general valuation of work in progress, and for interim financial accounts. It also provides other particulars for realising the extreme importance of accurate and prompt cost accounting in industrial companies.



## CHAPTER VIII

### EXAMINATION QUESTIONS

1 *What importance attaches to interlocking cost accounts with the financial books?*

2 *Describe briefly an arrangement for agreement of cost and financial accounts to ensure control of all cost expenditure.*

3 *To what extent is the reconciliation of cost and financial accounts a guarantee of the accuracy of the former?*

*Final, I C W 1, 1932*

4 *Outline the general methods to be employed for ensuring the correct interlocking of the cost accounts with the financial records. Show the probable effect produced in the control accounts by a wrong posting in the cost ledgers and indicate the line of investigation to be followed for locating the error.*

*Final, I C W 1, 1937*

5 *Briefly describe a costing system wherein the financial accounts are reconciled with cost accounts.*

*Final, I C W 1, 1938*

6 *What principles should be observed in arranging for the interlocking of the cost accounts with the financial system, and what methods should be installed to attain this end?*

*Final, I C W 1, 1938*

7 *What do you understand by a work-in-progress Control Account? State the headings under which it would be debited and credited and the sources of these transactions. To what purpose would such an account be put, apart from its function as a Control Account?*

*Final, I C W 1, 1939*

8 *Discuss control accounts and their uses, with particular reference to the methods of reconciliation with the financial accounts.*

*Final, I C W A, 1944*

9 *State in general terms how arrangements are made for the agreement of cost and financial accounts. What are the difficulties usually encountered, how are they overcome and by what means are actual differences adjusted?*

*Final, I C W A , 1944*

10 *"Cost accounting and financial accounting are complementary functions, which involve analyses of the transactions of business which differ in form and purpose." Explain this statement, illustrating with examples*

*Final, I C W A , 1945*



## CHAPTER XIV

### STANDARD COSTS

Cost accounting by previously determined standards for material cost, labour cost and oncost, has been considerably extended and developed in recent years, especially by large manufacturing companies whose products are largely repetition work. The standards adopted are based on previous costs for material, labour and oncost, and the newer or current costs obtained for definite periods are compared with these standards, to show if there is progress or otherwise in economy for manufacturing.

Without being exhaustive, but more simply suggestive regarding the operation of standard costs, about which various books have been published, it can be shown from practical application that such costs were used, at least partly, for various products in much earlier years. This was accomplished by more manufacturers than may be supposed and long before cost accounting was generally adopted by other trades.

#### MATERIAL

Consideration of standard costs for material used in manufacturing has to be viewed broadly from one of two aspects. The first of these covers the class of manufactures in which the material requirements are relatively simple. This means that the quantity required either for jobs or process work, does not involve many qualities or varieties of quality, so that the quantity standard can be readily determined by weight or measurement.

In such instances, after having determined the correct quantity standard, variation in cost can only occur in the price of the material. A comparison of such actual and standard costs would be principally confined to revealing the efficiency or otherwise of the purchasing arrangements. As indicated in Chapter X under "Standard Costs," a similar procedure is sometimes adopted in large manufacturing companies having many operating departments.

In this case, all material required is debited to each manufacturing department at standard prices. This limits the sphere for efficiency in these departments to production economy in labour and oncost. For such arrangements, actual comparisons

of purchase prices and standard material prices are accounted in the principal cost department

Another similar method is sometimes adopted by manufacturers using standard costs and having several factories engaged in the same production. If the raw materials used are limited to a few virgin metals or other standard materials, for cost comparisons the market prices on the day of receipt of each order are used for the standard material costs. Variations observed when comparing with actual costs reveal the efficiency or otherwise of the purchasing department.

Manufacturers using many and varied materials for their products illustrate the other aspect to be considered when introducing standard material costs. When these various materials become part of the ultimate products, cost variations will occur in quantities used as well as purchase price. As a part corrective to such variations, it can be indicated that engineering products requiring castings and forgings of iron, steel and non-ferrous metals can have standard weights allotted for these castings and forgings. These are based on the same patterns or drawings supplied to the foundries or forgers from whom these supplies are ordered. This procedure does check the supply of excessive metal which may have been used by a sub-contractor to ensure sound supplies. This excess does add to the machining cost of the main contractor in obtaining the finished product.

#### LABOUR

Standard labour costs can be stated to have been inaugurated with the adoption of piecework prices, or a price per piece or part, for labour payment, and which was virtually a standard labour cost. By piecework payment, any reduction in the ultimate labour cost is confined to the economy effected by the reduction of oncost, because of increased output being obtained in a definite period.

The introduction in 1898 in this country of labour payment by results based on premium bonus methods necessitated the adoption of standard time allowances. This was to determine wage payment and labour cost, and the payment made was based on the particular bonus method adopted. These standard time allowances have always been based, in the principal premium bonus systems, on the ability of the average worker under ordinary working conditions. With the same percentage saving of the standard time allowed, the ultimate labour cost varies

in accordance with the particular bonus method adopted, as shown in Chapter VI. Nevertheless, in principle, the first basis of this cost is a standard cost in hours, that is, the value of the hours allowed for the work to be done, at ordinary time rate.

#### TECHNICAL COSTS

Having briefly reviewed the direct cost elements of material and labour for standard costs, it is apparent that for accurate accounting correct cost divisions, sections and detailed items must be arranged. These are shown in Chapters X and XI for specimen industries. For large technical units, etc., such as buildings, bridges, ships and their machinery, locomotives and motor vehicles, these will probably involve consideration of the specification for the product.

It is essential that these technical cost details should have the approval of the production departments as they are particularly concerned with the labour costs, the particulars of which usually emanate from these departments. It has been found that the adoption of standard labour jobs, although labour payment may be by time work, has increased economy in production. Effective cost comparisons for the same production by various operators is thus readily obtained and unnecessary labour waste avoided. Similar control of excess cost is achieved as when standard weights are available for castings and forgings obtained from various sub-contractors to the same pattern or design.

Consideration of the cost details necessary is most efficiently accomplished by relating these to the complete product or major part thereof. Accurate accounting of subsidiary details, for definite periods, sometimes shows their cost to bear a fairly constant relation to that of the major product. If desired, continuous accounting of these may be omitted and their cost estimated on a percentage basis, without loss of efficiency. This previous reliable accounting practically creates a standard percentage, the use of which reduces the expense of the cost finding.

#### ONCOST

The forecasting of oncost rates, when operating standard costs, is likely to entail full consideration of the expected volume of production, for the period under review. Fixed oncost as detailed in Chapter VII will be incurred, whether the establishment is idle or only partly employed. Expenditure for certain items of

fluctuating oncost will increase with increasing production, such as property and plant repairs, and tools upkeep. Estimated oncost rates must therefore absorb all the fixed oncost and the rates will vary inversely with the volume of production.

Expenditure for fluctuating, or what may be aptly termed operating oncost, increases generally as total cost of production volume increases, but these rates are likely to vary inversely with the output. Combined labour cost rates, for fixed and fluctuating oncost, will vary inversely with the labour cost of estimated production, as shown in Chapter XII.

If the labour cost is fairly uniform per production unit, and the production varies considerably from that assumed when fixing the standard cost, the standard and actual oncost rates will differ greatly. When the necessary information is accounted, this difficulty may be lessened. This can be done by adopting standard rates for fixed oncost, and also for fluctuating oncost applicable to certain production volumes, say, 70%, 80%, 90% and full production.

Such information does show the possible loss in not recovering oncost expenditure, if the expected production is not achieved, through lack of orders or other causes. It also shows the lower oncost rate applicable to the larger production possible. This is the reason why manufacturers can and do reduce selling prices to obtain more orders.

#### COSTS AND SELLING PRICES

Comparison of standard and actual costs is shown, in clearly defined sections for a technical product, by Form 31. These sections have been adopted not only to fulfil all the production cost requirements, but as a suitable basis for fixing selling prices or quotations. These selling prices may be desired to satisfy different technical details for the same class of production.

Such a uniform arrangement not only ensures more efficient cost accounting, but gives opportunity for accurate systems of selling prices. This also enables producers to prepare suitable price lists, not only for different sizes of the complete product, but with or without certain technical sections, as may be required. A specimen price list is shown by Form 32. The periodical issue of such lists of economical prices to likely customers, particularly when orders are scarce, does sometimes increase sales and correspondingly output, and also production profits.

## CHAPTER XIV

### EXAMINATION QUESTIONS

1 *An association of manufacturers wish to compile average cost figures for comparative purposes. What method do you recommend to make this comparison effective?*

2 *What is meant by the term Standard Costs? Describe their day to day operation*

*Inter, I C W A, 1932*

3 *Discuss the conditions to be considered in arriving at a standard cost for any operation in any industry with which you are familiar. State the nature of the industry concerned.*

*Final, I C W A, 1938*

4 *What are Standard Costs and how are they determined? State the advantages obtained from their use, and outline the manufacturing conditions in which they are likely to be of maximum benefit.*

*Final, I C W A, 1938*

5 *Distinguish between Uniform Costing and Standard Costing. Stress the evolution of the technique of the latter and comment on the service it makes available for management.*

*Final, I C W A, 1939*

6 *Enumerate the factors which require to be carefully considered in the establishment of Standard Costs, and state why it is essential that a careful preliminary survey of the business under review should be undertaken, before any attempt is made to introduce cost standards.*

*Final, I C W A, 1940*

7 *A company whose production is restricted due to war-time circumstances uses Standard Costs, and increases in selling prices are only allowable in relation to genuine increases in the prices of purchases and services. State how you would adjust the Standard Costs and determine and absorb the losses due to the reduced production.*

*Final, I C W A, 1940*

8 *In a manufacturing concern where Standard Costs are in use, it is found that there are certain unusually heavy fluctuations in cost figures, both upward and downward. Show how you would present the periodical statements, clearly indicating the departures from standards and their causes.*

*Inter, I C W A, 1941*

9 *It is decided that production shall be charged in the cost accounts at a standard rate, and any differences between actual and standard transferred to an "adjustment account." How can the latter be made an instrument of detailed cost control?*

*Final, I C W A, 1941*

10 *In dealing with Material Costs, outline the advantages and disadvantages of using Standard Cost methods.*

*Inter, I C W A, 1943*

11 *Prepare a typical Standard Cost statement of any product with which you are familiar, and show how the actual cost is arrived at by adding or deducting variations from standard.*

*Final, I C W A, 1943*

12 *What steps would you take in connection with —*

- (a) *The introduction of a new set of Standard Costs to replace existing ones,*
- (b) *A change in the basis of distributing certain Overhead Expenses to departments?*

*Final, I C W A, 1943*

13 *Discuss "Standard Costs," their advantages and disadvantages, and the conditions under which you consider adoption to be of greatest use. Indicate the circumstances under which the use of Standard Costs could be misleading.*

*Final, I C W A, 1943*

14 *It has been stated by a writer on costing that "the inclusion of any excessive or unnecessary expense is obviously wrong, the excessive expense should be regarded as a reduction from profit rather than an element of cost." Discuss this statement generally and particularly in relation to borrowed capital.*

*Final, I S A A, 1944*

15 *Prepare a comparative statement of costs, showing the actual with the pre-determined standard, with fullest possible explanations of the variations. State the steps to be taken as the result of the differences discovered*

*Inter, I C W A, 1944*

16 *How would you deal with operations which are not included in your Standard Cost, but may be required on some components in order to attain the inspection standard? Taking an industry with which you are familiar, give examples and show what analysis you would give to the Management*

*Inter, I C W A, 1944*

17 *Describe how a method of Standard Costs is operated, showing what additional internal arrangements are necessary for its working successfully. To which class of manufacture is it best suited?*

*Final, I C W A, 1944*

18 *Prepare a report for the consideration of a Works Director, outlining the advantages of installing Standard Costing, and state briefly the necessary conditions for its inception*

*Inter, I C W A, 1945*

19 *Under a system of Standard Costs, the Management wish to know what control information would be provided. Illustrate your answer with the statements to be presented under —*

- (a) *Labour,*
- (b) *Material,*
- (c) *Overheads*

*Final, I C W A, 1945*

## CHAPTER XV

### BUDGETARY CONTROL

Budgetary Control of manufacturing costs is usually accomplished more successfully when the cost accounting is by departmental or process methods, and not by job or order costs. Departmental or process costs usually represent repetition work, and this may be by mass production. The output obtained is usually based on a production programme determined by the manufacturing company in anticipation of market requirements.

#### DEPARTMENTAL OR PROCESS COSTS

After having determined the production desired for a certain period, and having previous costs or reliable estimates for the product, a budget can be prepared for the output expected. This must include the necessary alterations required, for changes in the costs of raw materials or supplies, labour cost and oncost to be absorbed. All these cost elements may be affected not only by anticipated new conditions, but by the volume of production desired.

For simple products, manufacturers not having previous costs, but able to estimate these reasonably accurately, may readily adopt serviceable budgetary control. This can be accomplished by the estimated costs method, referred to in Chapter X, and can be introduced for the production estimated for a definite period. Comparison with actual costs at the end of such periods reveals differences, which ensures more reliable cost estimates for material, labour and oncost, and, therefore, more accurate budgetary control in the future.

#### JOB OR ORDER COSTS

Job or order products based on customers' requirements do not permit of such reliable estimates, for future production quantities. Successful budgets for such are more possible where the products are of like nature, although varying in size and requiring many months for completion. For these large products, if previous accurate costs are available, a reasonably accurate budget may be prepared to cover the estimated costs for a definite period.



A particular instance can be cited of what was accomplished by budgetary control for job or order products, when there was severe depression among shipbuilders, marine engineers and boilermakers. The products were of one kind, although varying in size and having minor design differences, but previous reliable costs were available.

These producers decided to try and obtain sufficient orders, to accomplish a definite output in a certain period. For this purpose, the selling prices quoted for the orders available were reduced to the absolute minimum, that would give a certain percentage of profit. A reliable budget was prepared based on previous costs, showing the material required and the cost, labour hours and cost, and oncost likely to be incurred. The estimated profit in the budget was the sales value of the scrap material, resulting from production for the period. This scrap was that usually obtained from the materials used in production. Such successful budgetary control is only possible when previous reliable costs are available.

#### PRODUCTION AND SALES

Budgetary control, which is ultimately concentrated on production and selling costs, must be based on certain estimated outputs of manufactured goods, which are to satisfy the sales expected in the period covered. It is also obvious that certain manufactures, which can be produced economically by greatly increased outputs, may thus create markets for their disposal, owing to the reduced selling prices which are possible.

Increased outputs from the same plant may reduce costs of material, by the purchasing and consuming of larger quantities in the same period as formerly. Greater production may be obtained by the introducing of piecework or labour payment by results. These methods of labour payment are usually more successful when work is plentiful and full production is obtained, and thus the direct labour cost per unit may be decreased.

#### ONCOST

Likewise, oncost expenditure per unit of output, will show a decrease if full output or continuous production is possible, when this is compared with costs of part production or irregular working. This does not mean that the oncost rates will always be reduced, when these are allocated on the labour cost basis,

and increased output has been obtained. Increased production may mean decreased labour cost per production unit, due perhaps to labour payment by results or better organisation for the larger outputs.

Oncost expenditure, for varying outputs, is more difficult to estimate for budgetary control than material and labour costs, notwithstanding that previous reliable particulars are available. Where possible, it is best to allocate oncost rates per production unit. Changes affecting these rates are, thus, more readily observed and the source traced, which may come from labour payment methods, class of labour employed or alteration in production arrangements. When oncost rates cannot be allocated to production units, but are based on labour cost, this may be a rising percentage as already indicated. This may be due to decreased labour cost of production, and such a reduction should be expected if improved manufacturing methods are introduced.

#### ONCOST CONTROL

Accounting of oncost, by expense classification of such consumable supplies as cotton cleaning waste, lubricating oils, and cutting compounds for engineering production, is sometimes profitable. If the expenses are compared regularly, weekly or monthly, and show extreme variations, enquiry departmentally or generally, may prove that these differences are justified. If they are not justifiable, arrangements may be made to prevent a continuance of these, and thus reduce or prevent a continuance of waste.

Where completed production entails erection on site or fitting on board ships, marked differences may occur for certain oncost expenses. Such oncost expenditure, when incurred outwith the actual production establishment, is much more difficult to control, and waste due to extravagant use is always possible. It is essential to examine such expenditure regularly, to ensure that it is reduced to the minimum consistent with production efficiency.

#### PRODUCTION CONTROL

Efficient budgetary control does necessitate full consultation with the Production Management. This is not only to obtain agreement regarding possible economies for various outputs, but to ensure control of the production expenditure for these

outputs. The possible economies in production cost are not only confined to the use and rate of delivery of materials, and the organisation of labour required, but are sometimes affected by the nature and output rate of scrap materials or by-products.

Regular comparison of budgetary control figures with current costs does reveal differences which sometimes necessitate a revision of the budget. This may obviate an unnecessary irregularity in output rate or prevent avoidable extra expense, to accomplish the output required to satisfy the sales effected. Budgetary control when departmentally arranged, gives opportunity for approval of increased cost necessary in these departments because of special circumstances affecting production or sales. Form 33 is a comparison of budget with actual costs.

#### SELLING AND DISTRIBUTION ONCOST

Budgetary control of selling and distribution oncost for domestic goods may involve much detail and the total of these expenses may be considerable in relation to the production cost. In such cases, it may be necessary to account these by expense classification, such as packing labour and materials, transit, warehousing and display expense, duty, credit and collection including discounts. There are also the usual salesmen's salaries and commissions, advertising, etc., and allowance may have to be made for expected returns in the case of certain goods, particularly for those which are sold on consignment account.

The allocation of selling and distribution oncost may be on the basis of production costs, sales value or quantity sold, if the goods are uniform or standard products. If the selling and distribution oncost is accounted for definite areas and controlled effectively not only are comparisons of budget and actual figures available, but valuable comparison can be made between different areas.

Such particulars give opportunity for price reduction to increase sales in profitable areas, and to endeavour to reduce this oncost in less profitable areas. Budgetary control of selling and distribution oncost, for definite areas, may also give opportunity for creating suitable markets elsewhere. Such development may be possible, because of the information available for similar areas, previously successfully organised for profitable sales.

## CHAPTER XV

### EXAMINATION QUESTIONS

1 *Prepare a budget of cost expenditure for departmental or process products or job or order costs*

2 *State where variations of actual costs with budget systems are most likely, and give reasons*

3 *In what manner does a budgetary system operate in controlling factory expenses? Illustrate fully its probable effect upon the expenses*

*Final, I C W A , 1932*

4 *Do you consider it advisable to budget for the items of overhead expenses in the factory? Draw up a scheme showing the bases on which you depend*

*Final, I C W A , 1934*

5 *What principles should be followed in making cost comparisons between alternative methods of production or distribution, and what steps are necessary to ensure their due observance*

*Final, I C W A , 1938*

6 *Explain the meaning of budgetary control in connection with any business with which you may be familiar. How may the budget be constructed and its accuracy tested, and how may it be used as an instrument of management?*

*Final, C A (Eng ), 1940*

7 *Enumerate three general groups into which you would classify selling and distribution expenses, so that the cost of selling particular jobs or products may be found. Explain the methods you would use, and state the nature of the business or industry to which they would apply*

*Inter , I C W A , 1940*

8 *Discuss the relationship of Budgetary Control and Costing*

*Final, I C W A , 1943*

9. A production budget is based on the capacity of a factory say 1,000 articles a week. The actual production for three months shows an average of 800 articles per week and the cost per article shows an increase on the budget figure under every heading.

What action is called for under such circumstances?

*Final, I S 1 A, 1944*

10. Define

(a) Cost Accounting, and

(b) Cost Control

Explain their inter-dependence and the advantages and disadvantages which might be expected to arise from their co-ordination

*Final, I S A A, 1944*

11. By what methods should Standard Costs be prepared, and what use would be made of budgets for this purpose?

*Final, I C W A, 1944*

12. A manufacturing company requires you to instal a flexible system of Budgetary Control in connection with its overhead expenses. Choose six items of expense, and state what unit of measurement you would adopt for each, to determine the variable budgetary amounts. Give your reasons.

*Inter, I C W A, 1945*

13. The order book of the Company shows a falling off of 25 per cent in orders for the next three months. In preparing your budget of expenses for this period, to what items would you pay particular attention? Give your reasons.

*Final, I C W A, 1945*

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